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Leafy Berries in Mitchella repens.

By WILLIAM R. DUDLEY.

(Plate XXVI.)

Several suggestive variations, more or less teratological, have come under the writer's observations during a few years past, and one is here offered to the readers of the BULLETIN which seems to follow a line of departure apparently of rare occurrence. It is the adnation, more or less complete, occurring between the berries and the true leaves of *Mitchella repens*, L.

By reference to the accompanying plate, it will be seen that a series is made out showing all conditions, from the partial adnation of one leaf-petiole (Fig. 2) to the complete envelopment of the berry by the expanded bases of both leaf-petioles (Fig. 5). There were twelve or fifteen excellent specimens in the writer's possession at the time the drawings were made (Nov., 1881), representing all grades of this union, between those shown in Figs. 2 and 5. There is, therefore, no mistake as to the true origin of these foliar organs.

The drawings need little explanation; but there are a few characters not readily made out from a black and white drawing. First, the blades of these adnate leaves were, in all cases, of the usual green color, or only a little paler. Second, in Fig. 2, the leaf on the left seems to arise from the side of the berry; but, from the *apparent* base of the petiole, the true base is plainly seen to expand, forming a broad convex covering, clasping and organically combined with the lower part of the berry itself.

The clasping base in this case, and in those in Figs. 3, 4 and 5, has always the ordinary scarlet color of the berry, and, in every way simulates its surface. Even the base of the petiole of the leaf on the right in Fig. 2 was tinged with red on account of its proximity to the red fruit. Third, it is well known that the *Mitchella* flowers are usually twin, producing two corollas, etc., but only one berry, which is inferior. The two calyx-scars are seen in Fig. 2, but the berry is so distorted, apparently by the diversion of the sap-currents into the detached leaf, that the calyx on the right is much below its usual position. Again, in Fig. 5, we find only one calyx, possessing, however, two styles, as will be seen in the vertical section of the same (Fig. 6).

We have been led to present this freak of the partridge-berry somewhat in detail, not simply because we believed there was no published record of its occurrence in this species, but chiefly for the following reasons: In the various teratological works and papers within reach, no example of a precisely similar malformation is given

of any plant. True, among the host of recent observers, it would be strange if similar cases had not been noticed, and probably records of such exist, but they cannot possibly be of common occurrence. Again, although the origin of these foliar members is evident, the meaning of the adnation is not clear; as the meaning of the reversion of the parts of a flower to leaves is clear, in the light of our accepted theory of metamorphosis.

In attempting to find the cause of the union between parts so rarely found organically united, a few facts and features were seen to stand out prominently, and led the writer to adopt the view (not a conclusive one, however,) presented later on. These facts serially stated are:

(1). The true peduncle has entirely disappeared, and those parts of the petioles coming in direct contact with the berry have become a part of it, and have readily assumed its color, texture and general aspect.

(2). This union has not interfered with the fruitfulness or development of the ovary, the seeds being present, and the size of the berry not being under the average.

(3). The flowers become consolidated, as in Fig. 5, and an increase or suppression of parts occurs in such cases without interfering with the development of the berry.

(4). In Figs. 3 and 4, where the twin corollas and calyces are distinct, there will be observed, half-way between them, a small fleshy point or protuberance, as if some extra-floral part, possibly a receptacle-like axis, had sought to show itself.

Taking these facts together, they seem to fit one hypothesis better than any other. In consideration of these points we may remark that it is stated, on good authority (see Prof. Morren's papers and Masters's Veg. Teratology), that floral monsters are usually sterile, not only on account of the suppression of stamens or carpels, but from the general disorganizing influence of such malformations. But, as we have already stated, fertility does not seem to be interfered with in our leafy partridge-berries, not even in the cases where there is a consolidation of both flowers. This condition of things has appeared to the writer to point to the conclusion that these changes are not far out of the line of the general tendency in the plant's life; and that the adnation seen may not be between as widely separated members as at first would appear. Furthermore, the first point mentioned, viz., the ready union of leaf-petioles with the berry proper, and their simulation of it, seems to indicate a closer relationship between its external portion and the leaves than we believe to exist between the leaves and the calyx. We have supposed, therefore, that a fleshy expansion of the receptacle, or an hypanthium, such as is supposed by many to exist in the lower part of the pear and some other inferior ovaries, might be present. With such a structure we could more readily imagine the union of the leaves to take place than with the calyx. At the same time, the essential organs would be less injuriously affected by this abnormal union. In brief, the changes would be between parts more or less extra-floral, and therefore not likely to seriously affect the fertility of the essential organs.

Finally, it would not be difficult to see how the twin flowers might be consolidated through the suppression of portions of this hypanthium; especially if we suppose the protuberance mentioned to be a continuation of it existing at the sides and between the two ovaries above, though not necessarily passing between and separating them internally. It is doubtful, however, whether this last point is worth much except as an attempt to explain the presence of these curious fleshy points.

In regard to Fig. 7, it was the result of a search for additional proof that the supposed petiolar expansions were really such, and superimposed over the parts commonly present. The cross-section was made above the middle of the berry, and revealed, in this one case, indistinct bands of narrow cells alternating with roundish ones, and corresponding in number to the wall of the carpel, the calyx and the epidermis of the fleshy petiolar portion. In other and similar sections no differentiations were found.

The section shown in Fig. 7, even allowing that the bands seen are to be interpreted as above, was made at such a height on the berry that it could be expected to throw little light, one way or the other, on the presence of a fleshy axis below, such as has been suggested in this paper. Subsequent sections made through the middle and lower portions of other berries revealed no differences in the hypodermal tissue that were at all clear.

All the specimens of the leafy berries from which the above studies were made were from this vicinity—the valley of Cayuga Lake. The larger number were collected in November, 1881. One (that from which Figs. 5 and 6 were taken) was found by Hon. H. B. Lord, along Cascadilla Creek, near Ithaca. The origin of the leafy appendages was not at all clear until a few days later, when by good fortune the writer found, about six miles from the first station, specimens representing all stages of the adnation. He noticed a single similar specimen on Cascadilla Creek in October, 1882.

The partridge-berry seems to be given to interesting variations. Its dimorphism has long been known. More recently, white berries have been detected at Canaan, Conn., and Moravia, N. Y.; and Dr. Atwood, the discoverer of the latter station, states that they appear on the same plants from year to year. Variations in the numerical plan of the flower, as well as the union of the two flowers, have been noticed frequently. Lastly, we note the adnation of the petioles of the upper pair of leaves with the fruit.

A word in regard to the common names. *Mitchella* seems to be pretty generally known as partridge-berry, especially by people who have studied botany. In certain portions of New England and Pennsylvania, however, it is called squaw-plum and squaw-berry, a name certainly indigenous, one might almost say aboriginal.

DESCRIPTION OF PLATE XXVI.—*Mitchella repens*, L., Fig. 1. Berry and upper pair of leaves, normal. Figs. 2, 3 and 4. Berries with leaf-petioles more or less adnate and fleshy. Fig. 5. Fleshy petioles completely enveloping the berry. Fig. 6. Vertical section of berry shown in Fig. 5. Fig. 7. Cell-structure of upper part of berry shown in Fig. 5. *a*, epidermis of expanded petiole; *b*, fleshy portion of petiole; *a'* and *b'*, fleshy calyx; *c* and *d*, carpellary portion.

Fern Notes. VI.

By George E. Davenport.

Aspidium Filix-mas, Swz., *in California.*—In the Bulletin for February, 1882, I announced the discovery of this species on Mt. Wrightson, in Arizona, by Mr. Pringle, and expressed the conviction that its discovery so near to California would stimulate the botanists of that State in their efforts to find it, as its presence there was more than ever probable. I now have the pleasure of announcing its discovery in the Halcomb Valley, in the San Bernardino Mts., at an altitude of about 9,000 feet, on the 1st of August, 1882, by those keen-eyed botanists, the brothers Parish.

This discovery is especially interesting from the fact that all previously reported discoveries of the species in California have apparently come from the very strong resemblance which some forms of the *A. argutum* of Kaulfuss bear to it; but, whatever doubts may exist in regard to other specimens, there seems to be no question as to the identity of the plant sent by Mr. Parish. The characters are unmistakably those of *Filix-mas* as distinguished from those of *argutum*.

These characters have previously been pointed out (*l. c.*), but it may be well to state here, in addition, that I have not found more than 5 fibro-vascular bundles in the stipes in my own specimens of *Filix-mas*, so far as I have examined them, although the number may reach 7 in others, as stated in Ferns of North America.

In my specimens from Canada (Mrs. Roy), Colorado (Brandegee and others), Dakota (Walter Jenney), and Arizona (Mr. Pringle), the number is uniformly 5, and there are but 5 in my specimens from England. In *argutum* I have found from 3 to 5, according to the size of the fronds, and probably the correct number for *Filix-mas* will be from 5 to 7, according to the size of the fronds; but, since the same number (5) occurs in both species, and in specimens of a nearly corresponding size, it is evident that this character cannot be relied upon for positive determination.

The plant which I have received from Mr. Parish is small, heavily fruited—the fructification descending to the lowest pinnæ—and, on account of its deeply serrated margins, belongs rather to the form described as var. *incisum* than to the typical European form. I have also received from Mr. W. N. Suksdorf the upper portion of a large frond, apparently belonging to *A. Filix-mas*, which was collected by him in Washington Territory in July, 1882. The range of this species in the United States may now be given as extending from Canada (Owen Sound), or Newfoundland, according to Kunze (who stated positively that he had "seen true *Filix-mas* from Newfoundland"), to Washington Territory, in the north-west, by way of Northern Michigan and Dakota, and to Southern California, in the south-west, through Colorado and Arizona. Its presence, therefore, in intermediate stations is to be expected.

Botrychium Virginianum, Swz., var. *gracile*, Hook. & Grev. (*B. gracile*, Pursh.)—Mr. Suksdorf sends from Washington Territory a specimen of this little fern, which Pursh (Fl. Amer. Sept. Vol. ii.,

p. 656) originally described, and which some still regard as a distinct species.

In drawing up his characters, Pursh seems to have relied chiefly on the presence or absence of pubescence as the distinguishing features between his plant and *B. Virginianum*. But an examination of any considerable number of specimens will show that pubescence is sometimes present in *gracile* and wanting in *Virginianum*, so that this character was not well founded. The other characteristics are only such as might be expected in plants in different states of development.

The plant first appears as a variety of *B. Virginianum* in Hooker's Botanical Miscellany (Vol. iii., p. 223, 1833), where it was published as such by Hooker and Greville from specimens communicated by Dr. Torrey, who (*vide* same authorities, *l. c.*) regarded it merely as a variety. Later (1843), Dr. Torrey so published it in his Flora of New York, and, according to Milde (Botrychiorum Monographia), in 1847 Presl also published it as a variety in the Supplement to his Pteridographiæ. This disposition of the plant was afterwards confirmed by Dr. Milde (*l. c.*), and is now very generally accepted.

The probabilities are, however, that this form is rather the *young state* of *B. Virginianum* than a true variety. Clarence Lown writes me that with him it is not uncommon, but that it is impossible to tell where the so-called variety ends and *Virginianum* begins; and such is the testimony of the specimens which have passed through my hands. It is more than probable that if we should trace the development of *B. Virginianum* from the prothallus upward, year after year, we would find the young plant at first smooth, and with an ever increasing pubescence with age. We could thus account for the infrequency of pubescence in young plants, some retaining their smoothness longer than others.

Mr. Suksdorf's specimen is typical of Pursh's plant. It is everywhere smooth, and the bud itself is wholly free from any trace of pubescence.

In the vernation of mature specimens of *B. Virginianum* the bud is invariably clothed with a hairy covering; but, in these younger plants, the bud is but scantily clothed at the most, or is wholly smooth (as in Mr. Suksdorf's specimen)—a circumstance which does not appear to have been noticed by any one heretofore (not even by Milde, who more than once distinctly notices the hairiness of the bud in *B. Virginianum*), and which was overlooked by myself in my Notes on the Vernation in Botrychia in the TORREY BULLETIN for January, 1878 (Vol. vi., p. 193). Probably a truer diagnosis of the vernation in this species than heretofore published will be: bud smooth at first (in the youngest state), finally pubescent, the hairy covering of the mature bud having only gradually been taken on with age.

This, possibly, may also be true of the vernation in *B. ternatum*, where the bud is even more densely clothed with hairiness; but I have not as yet seen, even in my smallest specimens, a bud of that species wholly free from pubescence. Its vernation, therefore, may remain as previously described (*l. c.*).

Asplenium Bradleyi, D. C. Eaton, *in New York State.*—The only station heretofore recorded (Ferns of North America, Vol. i., p. 40) for this rare fern in New York State is that of the hill at Newburgh, where Prof. Eaton found it in 1864. This station, there is every reason to believe, has since been destroyed. Mr. Peck, in a letter from which I am permitted to quote, says that he searched over and around the hill for nearly a whole day without finding any of this fern. The upper part of the hill, he adds, "had recently been cleared, and I suspect the station there is destroyed." New York botanists will therefore be pleased to learn that a new station has been discovered in the Shawangunk Mts. by Clarence Lown, of Poughkeepsie, who visited the mountains on the 21st of September, 1882, for the purpose of obtaining some *A. montanum*, and unexpectedly came upon *A. Bradleyi* growing near by.

Mr. Lown, who has already partially explored these mountains with good results, writes that he now has "stronger hopes than ever of finding *Asplenium pinnatifidum* in this mountain range." The consummation of these hopes may reasonably be expected.

Mr. Lown reports *A. Bradleyi* as apparently very scarce, and this appears to be the case in all of its other known localities, a fact which should be taken into serious consideration by all botanists who may at any time be fortunate enough to find it, and for which reason its exact locality is not more definitely given here.

Abnormal Asplenium montanum.—Mr. Lown sends some very curiously forked fronds of this species, also collected in the Shawangunk Mts., where, he states, forked fronds are not uncommon. I have noticed the same disposition to fork in specimens from other localities, and this little fern really seems to take delight in such freaks.

In most of Mr. Lown's specimens, the *stipes* forks near the base into two distinct stalks, each bearing a perfect lamina. In one instance, one of these double laminæ again becomes forked just above the first pair of pinnæ, dividing into two and giving to the whole the appearance of being three-fronded. In the commonly accepted mode of designation, this three-branched frond might be considered as three fronds with their stalks united at the base, but morphologically it can only be regarded as one. In other instances the forking occurs near the top, the main rachis forking and thus forming a bifid apex. This last manner of forking is frequently met with in nearly all ferns, and is especially characteristic of *Dicksonia pilosiuscula*, in which species it is often carried to such an extent that every pinna on the frond becomes bifid at the apex.

Abnormal Osmunda regalis.—Mrs. C. N. S. Horner, of Georgetown, Mass., has given me some interesting specimens of this species in which the fertile and sterile portions are strangely mixed up, the fertile panicle proper being partly sterile (in one specimen being crowned with a sterile apex) and the upper part of the sterile portion proper being fruited in a variety of ways. Some of the upper pinnules are crenately incised, others are fertile on one side, and some, strongly auricled at the base, are sterile for $\frac{3}{8}$ or $\frac{1}{2}$ an inch, and are then abruptly contracted into a narrow, double row of cap-

sules for an inch or so, when they as abruptly expand into a broad, sterile apex. Odd freaks in this species are not uncommon. Prof. Guttenberg and others have sent me specimens of a somewhat similar character before, and many of diverse character have come under my own observation.

Abnormal Botrychium Virginianum.—Forkings of the fertile branch in this species have previously been recorded by others, as well as myself, but the only instance known to me where the fertile panicle is partly transformed into a sterile one occurs in my only California specimen—one of three specimens collected in 1873 by F. A. Miller during an excursion to the Sierras from San Francisco for seeds and plants, and, I may add, the only specimen known to me as ever coming from California. In this specimen, the branches of the fertile panicle are alternately sterile and fertile all the way up. The frond itself is of good size and there is scarcely a trace of pubescence on it ; but, as the common stalk was broken off some distance from the base, it is impossible to describe its characters below.

New North American Fungi.

By Geo. Winter.

Sorosporium Ellisii.—Glomeruli forma magnitudineque varia, mox subsphæroidei, mox oblongi, opaci, e sporis numerosis compositi, 35–70 μ diam. Sporæ rotundato-polygoniæ, episporio granuloso, fuscæ dissolventes, 12–16μ longæ, 8–12μ crassæ vel 12μ diam.

Ad *Andropogonem Virginicam*, Newfield, New Jersey, et ad *Aristidam dichotomam*, Chester Co., Pa. Legit Wm. Trimble.

Ustilago Vilfæ.—Massa sporarum fusconigra, inflorescentiam totam implectens et destruens (fere more *Ustilaginis destruentis*). Sporæ subrotundæ vel parum elongatæ et oblongatæ, amœne fuscæ, episporio granuloso, 12–16μ diam. vel usque 19μ longæ.

Ad *Vilfam vaginæfloram*. Chester Co., Pa. Legit Dr. Martin.

Gonatobotrys maculicola.—Flocci solitarii, sparsi, in macula subrotunda angulataque fusca, fusco-nigro cincta, exarida, hypophylli, longi, erecti, flexuosi, fusci, basi parum bulbosi, septati, ca. 8–12μ crassi. Sporidia in nodulis parum prominentibus sessilia, elliptica, utrinque acutiuscula, fusca, 7–11μ longa, 5–7μ crassa.

Ad *Hamamelidis Virginicæ* folia languida. Bethlehem, Pa. Legit E. A. Rau.

Hottingen bei Zurich.

Notes on Grasses.—*Trichloris*, Fournier.—It was a mistake of mine to quote Fournier as the authority for *Trichloris Blanchardiana* (see No. 54 of the List of Pringle's Grasses, Bulletin, Vol. ix., p. 146). In fact, under the circumstances, it would have been better to omit the specific name altogether. Fournier, in the Gramineæ of the Mexicanarum Plantarum Enumeratio, not yet published, has two species of *Trichloris*, *T. fasciculata*, from Mexico, and *T. pluriflora*, from Texas (= No. 1,430 Berlandier). Without descriptions or specimens for comparison, I cannot say which name belongs to Pringle's grass. Mr. Bentham, in a recent letter, states that both

the species above quoted are evidently very near the two extra-tropical South American ones, *Leptochloris*, Munro, and *Chloridiopsis*, J. Gay, but require much closer examination to establish their specific distinctions.

I am confident that I have both of Fournier's species from within our limits—one from Laredo, Texas, communicated by Mr. Isaac Burk, and the other the grass collected by Mr. Pringle.

North American Genera of Grasses. (See BULLETIN, Vol. ix., p. 134).—*Lepturus*, Br., is represented by *L. Bolanderi*, Thurber, No. 4,669 Bolander, collected in the Russian River Valley, California. *L. incurvatus*, Trin., has been gathered by Mr. Burk and others from the ballast grounds near Philadelphia. *L. paniculatus*, Nutt., is *Schedonnardus Texanus*, Steud., *Lepturus* stands between *Agropyrum* and *Hordeum*. In the Gramineæ of the Genera Plantarum, now in press, I am advised by Mr. Bentham that *Isachne* is brought into Paniceæ between *Beckmannia* and *Panicum*. *Polypogon* follows *Agrostis*, and *Alopecurus* is placed in Phalarideæ.

Arundo, Lin., which immediately precedes *Phragmites*, should be included in my list of North American genera. Prof. G. C. Nealley, of the State College of Texas, has recently sent me specimens of *A. Donax*, L., collected in his vicinity, where it has probably been introduced, as the species is regarded as native only of the Old World.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Grasses Collected by Mr. Pringle.—Mr. C. G. Pringle sends an interesting lot of grasses which he has collected during the past season on the Pacific slope. These specimens, numbering about fifty species, fully sustain Mr. Pringle's character as a collector, for it is well known that no one makes better specimens or sends out more complete samples. Among the more desirable or interesting species in this lot, the following may be mentioned:

Phalaris amethystina, Trin.; *Hierochloa macrophylla*, Thurb.; *Stipa speciosa*, Trin. & Rupr.; *Epicampes rigens*, Benth.; *Gastridium australe*, P.B.; *Deyeuxia æquivalvis*, Benth. (*Agrostis*, Trin.); *Deyeuxia Bolanderi*, (Thurb.); *D. deschampsoides*, (Trin.), a species very distinct from Mr. Buckley's *Calamagrostis rubescens*, as will be seen by Mr. Pringle's specimens of the latter species; *Deyeuxia Aleutica*, (Trin.); *Aira caryophyllea*, L.; *Monanthochloë littoralis*, Engelman; *Lamarckia aurea*, Mœnch.; *Melica stricta*, Boland.; *Agropyrum caninum*, Reichb., a remarkable mountain form, appearing like a distinct species; and *Hordeum murinum*, L.

There are several species of *Agrostis* which have not before appeared in our western collections, and which are as yet undetermined. *Poa Pringlii* and *Diplachne viscida*, two new species discovered last year (1881), were collected in quantity in their original stations the past season.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Notes from Chemung County, N. Y.—On the 20th of July, 1882, I visited Mutton Hill Pond, Apalachin, Tioga County, N. Y., in

search of *Polemonium cæruleum*, L., a station for it given me by C. D. Fretz, M.D. I failed to find it, want of time preventing as complete a search as I should have liked. The locality is peculiar, a pond, surrounded by a bog, elevated, I should think, from 300 to 500 feet above the river valley and in a depression; south and west sides wooded, the others clear, and no visible source to keep up the water supply. However, I was rewarded for my visit, as I found *Brasenia peltata*, Pursh., *Pogonia ophioglossoides*, Nutt., *Carex comosa*, Boott., *Potentilla palustris*, Scop., in flower, and two or three plants as yet undetermined. In May, I found *Jeffersonia diphylla*, Pers., and *Phlox divaricata*, L., near Dansville, Livingston County; *Cassandra calyculata*, Don., near Wayland; *Dentaria laciniata*, Muhl., and *Allium tricoccum*, Ait., at Cohocton, Steuben County. *Adlumia cirrhosa*, Raf., grows on the hills south of Addison, Steuben County. For this county, I can report the following as new finds: *Cardamine rhomboidea*, DC., very scarce; *Viola stricta*, Ait., one station on bank of Chemung River; *Vitis riparia*, Michx.; *Hibiscus Trionum*, L., escaped; *Lespedeza Stuvei*, Nutt.(?); *Ribes rubrum*, L.; *Trifolium agrarium*, L.; *Sanicula Canadensis*, L.; *Solidago Muhlenbergii*, T. & G.; *Polymnia Canadensis*, L., Chemung Narrows, rare; *Cichorium Intybus*, L., streets, N. Elmira City; *Mulgedium acuminatum*, DC.; *Pycnanthemum lanceolatum*, Pursh., Newtown Cr. Horseheads; *Fraxinus pubescens*, Lam., Chemung River; *Phlox divaricata*, L., one or two specimens, rare, and the most easterly station in the State known to me; *Scutellaria galericulata*, L., bank of Chemung River; *Quercus macrocarpa*, Michx., rare along the Chemung; *Acorus Calamus*, L., rare; *Sagittaria heterophylla*, Pursh, "Buttonwoods," Elmira, only station known to me; *Allium Canadense*, Kalm., bank of Chemung, Ashland township, with *Viola stricta*, Ait.; and *Carex pallescens*, L.

I have over six hundred duplicates, from this county mostly, and would be glad to exchange with other botanists, or sell sets if desired.

Elmira, N. Y. THOS. F. LUCY.

Notes.—*Juncus acuminatus*, Michx., var. *legitimus*, Gray.—The form with proliferous heads has been very common during the past season. More specimens were found in this condition than otherwise, which I believe to be something unusual. These heads are almost invariably inhabited by large numbers of a species of aphis, which seems to find something peculiarly attractive there.

Elymus Canadensis, L.—Specimens of this also were found with proliferous heads.

Osmunda cinnamomea, L.—In the month of September I found in a meadow, from which a crop of hay had been removed early in the season, a large number of the sterile fronds of this fern, with the pinnæ contracted to a greater or less degree and bearing sori, but still distinctly retaining their foliaceous character. This condition seems to be something akin to the var. *obtusilobata* of *Onoclea sensibilis*, L. Its appearance, I have no doubt, is explained by the cutting off of the frond during its period of most vigorous growth, and the consequent shock to the vitality of the plant.

Raphanus Raphanistrum, L.—A double seed-pod was found, with each of the divisions perfect and filled with seeds, but united at the base and having a common stalk.

"*Twin*" *apples* were unusually numerous during the past autumn. These offer excellent examples of syncarpy, or the adhesion of fruits.

Houghton Farm, Mountainville, N. Y. W. E. STONE.

Botanical Notes.

The Lignified Snake from Brazil.—In a brief note in the December number of the BULLETIN, Dr. Gray, referring to an illustrated account of a lignified snake published in our November number, expressed an opinion that there was no snake in the case, and stated that, at the moment of writing, he had not time to offer the two credible explanations of the phenomenon that had suggested themselves to him. In the current number of the *American Journal of Science* we find these two explanations given, and we quote them herewith:

"Through the kindness of the Brazilian Minister," says, Dr. Gray, "we have seen and examined the original specimen, and have been presented with an electrotype of it. It is a great curiosity. The resemblance to a snake is wonderfully close, although 'the scales and cephalic plates,' which M. Olivier identifies with those of a particular Brazilian snake, exist only in a lively imagination. The snake-like surface is covered by delicate meshes of woody fibres; and here and there particular fibres of woody threads can be traced from the body to the woody surface. The adopted explanation requires us to suppose that a snake had forced his way between the bark and the wood of a living tree in a position exactly under a grub or a larva; had perished there when within half an inch of its prey; was somehow preserved from decay, even to the eye-sockets and the markings of the skin, until a woody growth had formed, the elements of which replaced the whole superficial structure of the animal—until the animal was lignified!

"Two other and more probable explanations have suggested themselves. One is that the snake-like body is of the nature of a root, an aerial root, like those of a *Clusia* or a *Ficus*, which was making its way between bark and wood; and that the supposed larva is an incipient root of the same kind. The other supposes that the sinuous course is the track of a wood-eating larva or some kind of insect, the burrowing of which had not destroyed the overlying liber: consequently the new growth filling the space (except at certain points) has naturally assumed the likeness of a snake. This explanation was suggested by Professor Wadsworth, of Cambridge, examining the specimen along with the writer; and it is to be preferred. Still, that head and neck should be so well outlined, and the former so well represent a pair of orbits, were surely most wonderful. But a close inspection of the electrotype showed that there had been some cutting away at the right side of the neck, and that the narrowing there was in part factitious; and less decisive indications suggested that other outlines had been touched up. The sub-

sequent inspection of the original confirmed this; and likewise enlightened us about the eyes. For the left orbit was found to occur, not in a woody structure, like that of the right side, but in a dark material having the appearance of pitch or cement of some sort.

"We may rest assured that whatever there may be which is factitious in this most curious *lusus naturæ* originated before it came into the hands of His Excellency the Brazilian Minister at Washington. If these marks were not discerned by any of the Parisian *savants*—which we are slow to believe—they are less likely to have been noticed by Señor Lopez Netto, whose honor and good faith are incontestible."

The character of the object might, it seems to us, have been at once determined by making a transverse section to ascertain whether the serpentine form contained within it a bony frame-work, which, in the situation where the alleged lignification was detected, would naturally have proved imperishable.

Action of Poisons on the Petals of Flowers.—A. Anthony Nesbit, F.C.S., states in the *Journal of Science* that he has made some experiments on the action of various substances on the life of flowers, and for this purpose selected some of the best known alkaloids, viz., strychnine, solanine, digitaline, quinidine, atropine, quinine, cinchonine, picrotoxine, aconitine, brucine and morphine, using one-quarter per cent. and one per cent. solutions. The alkaloid of tobacco being very difficult to obtain pure, owing to its rapid oxida tion, 5 per cent. and 20 per cent. solutions of tobacco (bird's eye) were used in its stead. The flower chosen for experiment was the *Narcissus*, and the results showed that there was here a wide field for long and patient investigation.

Of all the twelve solutions, tobacco proved, in a very marked manner, to be most destructive to the life of the flower of the *Narcissus;* the remaining eleven poisons, though but slowly injurious, nevertheless in some instances showed marked difference of effect, or, it may be said, symptom. Thus strychnine, next in poisonous power to tobacco, drew the petals upward, and made them dry and brittle, symptoms also exhibited by solanine poisoning, while quinidine and several other alkaloids rendered the petals limp and rotten. Morphine, one of the least poisonous (to the *Narcissus*) of the alkaloids experimented with, without destroying the flower, curiously enough imparted to the petals a flaccidity resembling that of the petals of the poppy.

The Fungi of Cincinnati.—The Catalogue of Plants collected in the vicinity of Cincinnati, Ohio, during the years 1834-44, by Thomas G. Lea (Cincinnati, 1849) contains a list of fungi, with notes on the species and descriptions of many new ones by Rev. M. J. Berkeley. The Cincinnati Society of Natural History has rendered a great service to the many students of mycology in this country by republishing, in the current number of its *Journal* (Vol. v., No. 4), all that pertains to fungi in the above-named catalogue, which has long been out of print and is now inaccesssible. We are indebted for a copy of the paper in pamphlet form to Mr. Davis L. James, through whose instrumentality, we presume, the Society was induced to reproduce it.

Proceedings of the Torrey Botanical Club.—At a meeting of the Club, held at Columbia College Tuesday evening, December 12th, Prof. E. H. Day, in the absence of the presiding officers, occupied the chair.

The Librarian reported on the books and periodicals received for the library since the last meeting.

Mr. B. B. Chamberlin exhibited a specimen of *Rubus* with a fasciated stalk.

Acrostichum aureum Growing by Fresh Water.—Prof. Day exhibited specimens of *Acrostichum aureum*, L., collected by him in Cuba, and one of *Aneimia adiantifolia*, Sw., from New Providence, W.I. The specimens of *Aneimia* had four fertile segments on the frond.

With regard to the *Acrostichum*, Prof. Day remarked that Prof. Eaton, in Ferns of North America (Vol. ii., p. 95), writes of this species as "being perhaps the only known fern which grows only within the influence of salt water;" and he quotes Dr. Garber as corroborating this statement in regard to the localities to which it is restricted in Florida. Several authorities referred to agree with this view; though J. Smith, in the Historia Filicum (p. 146), says it is found "in most fern regions throughout the tropics of both hemispheres." The specimens exhibited were found growing luxuriantly by the side of a fresh-water stream, several miles inland, at an elevation of at least one hundred to one hundred and fifty feet above the sea and on the southern side of a range of hills, the side away from the ocean, where there was no suspicion of brackish water or of marine influence. It is thus an interesting question whether this fern had migrated up the stream, or whether it had survived the geological change which had elevated the range of limestone hills on which it occurs, gradually adapting itself to the change of soil and conditions.

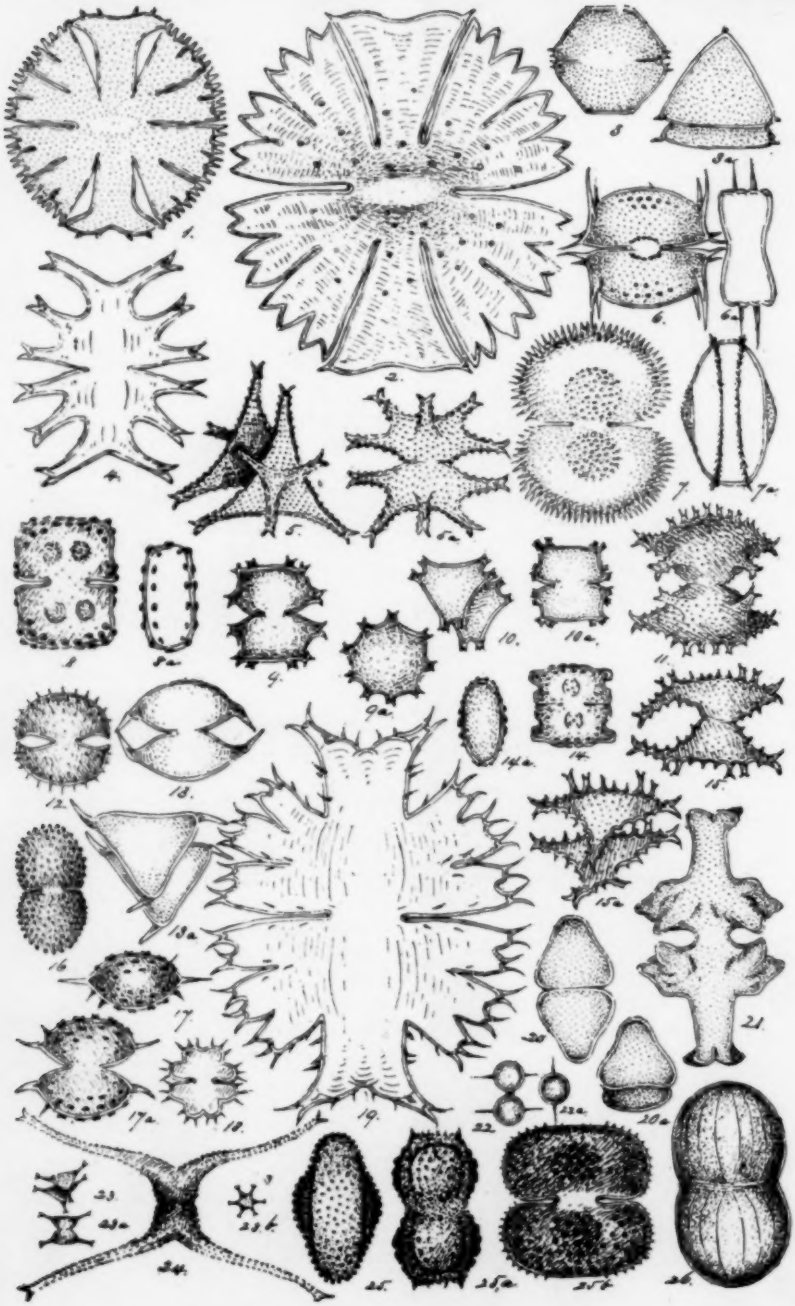
Mr. Britton called attention to a specimen of the same species, in the Torrey Herbarium, from Pine Key, Florida, collected by the late C. F. Austin, which is labelled "fresh-water pools." This, however, does not necessarily indicate that it was out of reach of marine influence.

Mr. Britton reported that he had observed an instance in New Jersey where *Andromeda Mariana*, L., had flowered a second time during the season.

Mr. Hollick read a paper on the Flora of Richmond County, N. Y., giving a list of the additions that had been made thereto, and of the new stations that had been observed during 1880, 1881 and 1882.

The Chairman of the Herbarium Committee reported that the collection of plants left by the late M. Ruger had been incorporated with the Club's herbarium, and that the latter at present contains 1,203 species, represented by about 1,400 specimens, all of which have been properly labelled and arranged, and catalogued for reference. The Committee recommended that the field of the Club's herborizations be extended from a radius of 30 to one of 100 miles around New York City. The suggestion was agreed to.

One person was elected an active member.



NEW AMERICAN FRESH-WATER ALGÆ.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, February, 1883. [No. 2.

Fresh-Water Algæ. VII.

By Francis Wolle.

(Plate xxvii.)

The following latest information concerning fresh-water algæ is submitted for the benefit of numerous friends to the cause of microscopical botany, as well as of botanical research in general.

During the past summer there have been abundant additions made to this particular division of the flora of the United States—a result largely due to the kindly assistance of volunteer collectors in the more distant parts of the country, as also of others nearer home. Indeed, but for these, the microscopist would often be at a loss for specimens worthy of his attention. I take pleasure in connection with this in acknowledging the valuable aid received from Rev. H. D. Kitchel, D.D., in working up the material that was gathered from various sources.

As the number of American students of the fresh-water algæ has greatly increased during the past few years, I have yielded to a general desire, and given the diagnosis of new species in the English language. Hitherto our students have been greatly outnumbered by European, and therefore the descriptions were given in a language familiar to all, irrespective of their nationality. With this change I adopt also the metric system of measurements.

In the appended list of new plants, all those credited to Minneapolis, Minn., were collected and forwarded by Miss Eloise Butler of that place. Miss Butler, first a student under Prof. C. E. Bessey of botanical fame, then a member of the Summer School of Science, under Prof. J. C. Arthur of the Iowa Agricultural College, Charles City, has, in her contributions sent me for microscopical investigation, furnished much more that is new than has any other collector this year.

Mr. A. D. Balen, of Plainfield, N. J., has been particularly fortunate in establishing beyond controversy the fact that the tropical alga *Pithophora*, Witt., is not confined to the tropics. Hitherto I have found it only in one small pond in this vicinity, where it was supposed to occur adventitiously. Mr. Balen finds it in three distinct localities within a circuit of about six miles around Plainfield.

Of new foreign literature upon the subject of fresh-water algæ, the following are the most important contributions:

Two volumes of the series Algæ Exsiccatæ have been issued by Prof. V. Wittrock and Dr. Otto Nordstedt of Sweden. The two volumes are the 9th and 10th of the series. Each number contains fifty specimens, European and American, finely mounted. No words

can convey so correct an idea of a form as a view of the plant itself.

The third number of Cooke's British Fresh-Water Algæ has appeared.

N. Wille, of Norway, has published a good paper (in Norwegian) on the transitions and developing forms of the Confervaceæ.

M. Ed. Bornet, of Paris, has published a valuable article (in French) on *Mazæa*, a new genus of algæ of the order Crytophycees.

Dr. J. Rostafinski, of Cracow, has published a monograph (in Polish) on *Hydrurus* and its connections.

Prof. G. Lagerheim has made a contribution (in Swedish) to the knowledge of several orders of algæ in the vicinity of Stockholm.

Dr. Paul Richter, of Germany, has put forth a paper (in German) on the question, "Is *Sphærozyga Jacobi*, Ag., a synonym for *Mastigocladus luminosus*, Ktz."

The latest from Prof. A. Borzi, of the University of Messina, Sicily, is the third part of his valuable contributions (Italian) on the Morphology and Biology of the Phycochromaceæ.

For a work on the American fresh-water algæ, I fear the time is not yet ripe to heed the solicitations of friends. It is true, I have added over seven hundred new names to the list of the flora of the United States, but, so long as each returning summer brings an addition of fifty or more new varieties, it would seem well to defer it.

ŒDOGONIUM, Link.—*Œd. Boscii*, Witt. Collected by R. Hitchcock in a pond at Weehawken, N. J. *Œd. Tyrolicum*, Witt. In a pond, Pennsylvania. *Œd. crassiusculum*, Witt. Pennsylvania and New Jersey. *Œd. obsoletum*, Witt. Pennsylvania. *Œd. concatenatum* (Hass.) Witt. Plainfield, N. J., collected by A. D. Balen; also near Bethlehem, Pa. *Œd. Landsboroughi* (Hass.) Witt. Elmira, N. Y. *Œd. princeps* (Hass.) Witt. Minneapolis, Minn.

BULBOCHÆTE, Ag.—*B. Monili*, Witt. & Lund. Collected by A. C. Stokes, Trenton, N. J.

GONATOZYGON, D. By.—*G. asperum*, Ralfs. Ponds, Eastern Pennsylvania.

VAUCHERIA, DC.—*V. tuberosa*, A. Br. Collected by Prof. S. A. Forbes, of the State Laboratory of Natural History, Normal, Ill. The plant was dredged from Lake Michigan, four miles from Chicago, from a depth of 36 feet. This form was first described by the late A. Braun, of Berlin, from specimens found in deep waters, and also in marshy places on the continent of Europe. I have another form, collected by Capt. J. D. Smith in a marsh in Georgia in 1878. The filaments are less than half the size and devoid of the tuber-like stolons; and it is three to five times as dichotomous as the typical form. I will call this var. INTERMEDIA, *n. var.* A third form, var. DELICATISSIMA, *n. var.*, is found on wet planks here, and, during the past summer, occurred in a small pool on the banks of the Susquehanna River, Harrisburg, Pa. The filaments are very thin and measure only 10μ–12μ. The branching is not so frequent, but the constrictions at the base of the branches, and interstitially, are the same. Dr. Rabenhorst questioned the propriety of classifying the typical form, the only one known to him, as a *Vaucheria*. It is very unlike all other

forms in the dichotomous branching, in the constrictions, and in the fruit.

OPHIOCYTIUM, Næg.—*O. cuspidatum* (Bailey) Rab. Pond, Mt. Everett, Mass. This plant was discovered by Prof. Bailey more than thirty years ago in a pond in Rhode Island; but it has probably not been seen since. It never received a record in an American publication, and hence this note. The proportions are very unusual for a plant of this genus, the measurements being: diameter, 50μ; length, 150μ; length of aculei at ends of cell, 15μ.

PROTOCOCCUS, Ag.—(A questionable genus.) *P. vestitus*, Reinsch. Ponds, New Jersey and Pennsylvania.

POLYEDRIUM, Næg.—*P. gigas*, Wittr. Ponds, Pennsylvania and New Jersey.

SPIROGYRA, Link.—*S. calospora*, Cleve. Collected by J. Reighard, Ann Arbor, Mich. *S. varians* (Hass.) Ktz. Mountain springs. *S. laxa*, Ktz. Ponds, Pennsylvania.

S. setiformis, var. INEQUALIS, *n. var.*—A peculiar variety of this species, consisting of two sizes of filaments, the one 125μ, the other 80μ in diameter; the two in conjugation. The smaller form has the thickness and the appearance of *S. nitida*, but must be counted a variety of *setiformis*. Sometimes two larger filaments are in conjugation, sometimes two smaller ones; but more frequently a larger and a smaller one are united. The spores in both cases are of the same size; a fruit-bearing cell of the larger filaments is not quite filled with the spore, but a spore-cell of the smaller filaments is usually considerably swollen.

S. Hantzschii, Rab., and *S. fusco-atra*, Rab., the latter probably a form of *decimina*, Mül., both from pools near Harrisburg, Penn.

ZYGOGONIUM, Ktz.—*Z. Ralfsii* (Hass.) Ktz. Ponds and marsh lands of Bucks County, Penn.

PLAGIOSPERMUM, Cleve.—*P. tenue*, Cleve, var. CRASSIUS, *n. var.* Shallow water, Bethlehem, Penn., and Florida.

MOUGEOTIA, D. By.—*M. glyptosperma*, D. By. Pond, Minneapolis, Minn.

GONATONEMA, Wittr.—*C. ventricosum*, Wittr. In shallow water on river shore. *G. notabile* (Hass.) Wittr. In a pond. Both species in the vicinity of Bethlehem, Pa.

These forms agree well, in size of filaments, length of articulations and dimensions of spores, with the plants described; but neither has the geniculate character of the fruiting-cells fully developed; some are perfectly straight and others only slightly crooked.

CLOSTERIUM, Nitzsch.—*C. costatum*, Corda. Ponds, New Jersey and Pennsylvania. *C. nasutum*, Nord. *C. acuminatum*, Ktz. *C. decussatum*, Ktz. The latter agrees with the description, except in size, having only about one-half the dimensions of the form described. It is true to its name.

C. angustatum, Ktz., var. RETICULATUM, *n. var.*—This form differs in having the striæ more or less spirally elongated, often producing a reticulated appearance.

All the above, except the first, are from ponds, Mt. Everett, Mass.

CALOCYLINDRUS, D. By.—*C. diplospora*, Lund. Pond, Mt. Everett, Mass.

C. COSTATUS, *n. sp.* (Plate XXVII., Fig. 26).—Cell ovaliform, with central constriction, nearly twice as long as wide; front view a constricted oval; end view circular. Constriction slight, forming an obtuse angle; membrane longitudinally costate; costæ distinct, 5–7, converging at apices. Diameter of cell 50μ; length, 90μ.

In a pond, Mt. Everett, Mass.

According to some authors, this plant might be classed with *Docidium;* but, lacking the usual inflations at the base of the semicells, it is more properly placed as above.

DOCIDIUM, Bréb.—*D. verrucosum*, Ralfs. Frequent in ponds, Mt. Everett, Mass.

COSMARIUM, Corda.—*C. galeritum*, Nord. Marshes, Pennsylvania. *C. speciosum*, Lund., and *C. pulcherrimum*, Nord.; both rather rare, but they occur occasionally in ponds in New Jersey, Pennsylvania, Massachusetts, and no doubt in all States of the Union. *C. spectabile*, DeNtris. Pennsylvania. *C. reniforme*, (Ralfs.) Arch In Florida, and at Minneapolis, Minn. *C. grande*, Lund. Minneapolis. *C. tithophora*, Nord., and *C. DeBaryi*, Arch.; both from ponds, Mt. Everett, Mass. *C. pyramidatum*, Bréb., var. *stenonotum*, Nord. Minneapolis, Minn.

C. TRIPLICATUM, *n. sp.* (Plate XXVII., Figs. 8 and 8*a*, front and end views).—Cell about one-fourth longer than wide, subrectangular; angles obtuse; sinus between the semicells linear; margins irregularly granulate, crenate; membrane rough with larger and smaller granules; the larger ones arranged in series of three; three on the margin of each of the superior rounded angles; three within the margins and three near the margin, between the angles; at the margins of the inferior angles two larger granules, and, within the margins, a few smaller scattered granules; end view quadrangular-oval, two series, usually of six longer granules, on each of the longer sides; one series on the margin and one within. Diameter of cell, 40μ; length about 50μ. Sporangium spherical, with long spines, acute at the ends.

Ponds, Pennsylvania and New Jersey.

The nearest approach to this plant is *C. Ungerianum*, Næg. It differs in its smaller size, the details of outline, and arrangement of the longer granules.

C. SEELYANUM, *n. sp.* (Plate XXVII., Figs. 14 and 14*a*, front and end views.)—Cell small, quadrangular, deeply constricted; sinus narrow, linear; semicells twice as wide as long, with a small rounded notch in the middle of the sides; the superior angles slightly produced laterally; ends in middle about half the breadth, somewhat produced and crenated; membrane at the superior and inferior angles, and near the margin of the ends, with 3 or 4 granules. Diameter of cell, 25μ–30μ.

Frequent in a pond at Elmira, N. Y.

C. ELOISEANUM, *n. sp.* (Plate XXVII., Figs. 7 and 7*a*.)—Cell rather large, one-third longer than wide; constriction forming a deep, linear, outwardly widening sinus on each side; semi-cells semicircular, margins set with long pointed teeth or aculei; centre inflated and granularly rough, intermediate area smooth or punctate; end

view oval; tumor in the centre granular; two distinct longitudinal, nearly parallel rows of teeth or aculei. Diameter, 75μ; length, 100μ.

Pond near Minneapolis, Minn.

C. ACULEATUM, *n. sp.* (Plate XXVII., Fig. 12).—Medium size, suborbicular, length slightly less than the diameter; constriction deep, forming, by the incurving of the angles of the semicells, two elliptical sinuses; membrane primarily more or less densely aculeated; later, the aculei drop off and leave short granule-like stumps. Length of cell, 30μ; breadth, 33μ; breadth of constriction, 10μ.

Pond, Minneapolis, Minn.

The outline of this species bears a resemblance to that of *C. Smolandicum*, Lund., but it is aculeated and devoid of the papilla at the angles of the semicells.

C. amœnum, Bréb., var. TUMIDUM, *n. var.* (Plate XXVII., Fig. 16).—Usually somewhat larger than the typical form; proportions the same, but the sides of the semicells tumid, not "rectis parallelis."

Occasional in ponds in Pennsylvania and New Jersey.

C. EVERETTENSE, *n. sp.* (Plate XXVII., Figs. 25, 25*a* and 25*b*, end, side and front views).—Cell as long as wide; constriction deep linear; semicells broadly rounded at the ends, inferior angles obtuse and close; membrane granular, with large verrucæ arranged in concentric series; apex usually nude, surrounded by short, acute, conical teeth or aculei; end and transverse views showing a decided central inflation. Length and breadth, 50μ–51μ.

Ponds, Mount Everett, Mass.

C. Brebissonii, Menegh., comes nearest, but differs in the form of the verrucæ, their uniform shape, and their even distribution over the cell; it is also without the central inflation.

XANTHIDIUM, Ehrb.—X RECTOCORNUTUM, *n. sp.* (Plate XXVII., Figs. 6 and 6*a*).—Cell as long as wide; constriction linear, somewhat gaping; semicells semicircular, finely punctate, or smooth; two rows of beads above the central protuberance, the one with 6–10 and the other under it with half the number; another series of beads on the base, forming a ring around the isthmus; ends broadly rounded, nude; basal angles armed with two pairs of aculei, one horizontal, subulate, the other vertical, straight, neither curved nor divergent; having the form of an hour-glass when viewed transversely, truncate, crenate at the ends, with two vertical aculei in the centre. Diameter of cell, without spine, 55μ–60μ.

Frequent in ponds, Mount Everett, Mass.

This form differs from *X. antelopæum*, Bréb., its nearest of kin, in having the end of the cells bare, the aculei not incurved or divergent, but straight and erect, attached to the sides and springing from the basal angle. It is also quite unlike that species in the three series of beads and in its transverse view.

ARTHRODESMUS, Ehrb.—A. RAUII, *n. sp.* (Plate XXVII., Figs. 17 and 17*a*, end and front views).—Cell slightly longer than wide, aculeated or verrucose; aculei short and stout, deciduous, leaving, after falling off, large verrucæ, usually six on the margin of each end, and two curved series of six each on the membrane within the

margin ; semicells broadly elliptical, with a single straight or diverging aculeus at each end. Diameter of cell, without aculei, 38μ; with aculei, 63μ.

This plant was gathered with *Sphagnum* (bog-moss) by Mr. E. A. Rau in a pond near Newfield, N. J., in the month of August last. It bears some resemblance to *A. divergens*, Rab., but it is not "subtilissime verruculosus ;" also to *A. quadridens*, Wood, but it is twice the size of that plant, and is not *quadridens*.

A. OVALIS, *n. sp.*—Cell small, smooth, about one-fourth longer than wide ; semicells oval, armed at each end with a straight or divergent aculeus. Diameter, without aculei, 20μ.

Ponds, Mount Everett, Mass.

A. Incus, Bréb., comes near this form in size, but is unlike it in its truncate ends.

A. ORBICULARIS, *n. sp.* (Plate XXVII., Figs. 22 and 22*a*, front and end views).—Cells very small, smooth, orbicular ; semicells united by a narrow isthmus ; aculei on opposite sides nearly parallel. Diameter, without aculei, 12μ.

Pond, Mount Everett, Mass.

EUASTRUM, Ehrb.—E. MAMMILLOSUM, *n. sp.* (Plate XXVII., Fig. 21).—Cell large, in length twice the diameter ; semicells three-lobed ; basal lobes wide and nearly half as high as the semicell, drawn out in the centre into a narrow column about one-fourth the width of the body, dilated at the end, sinuate, four-parted; base with six mammiform protuberances ; membrane punctate ; end view oval, with three diverging mammiform prominences at each end. Diameter of centre of cell, 68μ; of the ends, 28μ ; length, 118μ.

Pond, Mount Everett, Mass.

A distinct species ; the protuberances a prominent feature.

E. CUSPIDATUM, *n. sp.* (Plate XXVII., Fig. 18).—Small ; diameter slightly less than the length ; semicells distinctly three-lobed, basal lobes extending laterally their own width ; end lobe subrectangular, twice the width of the other lobes, obtusely sinuate in the centre ; ends of the rounded basal lobes, and of the two sections of the end lobe, surmounted each with three firm, diverging aculei. Diameter of cell, without aculei, 25μ ; length, 33μ.

Pond, Absecom, N. J. Contributed by H. D. Kitchel.

E. binale, var. MAJUS, *n. var.*—In all its details, except size, like the typical form, the dimensions being double the ordinary measurement. Diameter, 40μ ; length, 55μ.

In a pond near Newfield, N. J. Collected by E. A. Rau.

E. inerme, Lund., var. DEPRESSUM, *n. var.*—The standard form is nearly twice as long as wide, but the present form is only one-third longer than wide, and this difference produces a depressed appearance. Diameter, 36μ–40μ; length, 50μ–55μ.

Newfield, N. J. Collected by E. A. Rau.

MICRASTERIAS, Ag.—*M. brachyptera*, Lund., var. AMERICANA, *n. var.* (Plate XXVII., Fig. 19).—Distinguished from the form found in Sweden and described by Lundell, the polar lobe not being inwardly distended, but more or less tapering. The curved points on the apices of the lateral lobules are usually in pairs, not in threes.

The arrangement of the aculei on the membrane of the cell is also distinct. The size is very nearly the same, the width being 150μ and the length 190μ.

Collected in a pond near Minneapolis, Minn.

M. conferta, Lund., var. HAMATA, *n. var.* (Plate XXVII., Fig. 1).—The polar lobe is not *conferta*, compact, close against the adjoining lobes, as in the original form, but widely separated in the middle by a deep notch or contraction below the apex, thus giving the lobe a hamate form. Diameter, 88μ–100μ, slightly longer than wide.

Ponds, Mount Everett, Mass.

M. PSEUDOTORREYI, *n. sp.* (Plate XXVII., Fig. 2).—Large, circular, five-lobed; basal and intermediate lobes bisected, sections more or less conical, ends truncate and deeply furcate; polar lobe broadly cuneate, end truncate, slightly sinuate, angles cuspidate. Diameter of cell, 180μ.

Mount Everett, Mass.

Separated from *M. Torreyi*, Bailey, by its smaller size and the less number of lobules, and their greater similarity of form.

M. pseudofurcata, Wolle, var. MINOR, *n. var.* (Plate XXVII., Fig. 4).—Only half the size of the typical form, and in structure firmer. Diameter, 63μ–75μ.

Minneapolis, Minn.

STAURASTRUM, Mey.—*St. striolatum*, Næg., and *St. pygmæum*, Bréb., var. *obtusum*, Wille, in quiet waters, Pennsylvania. *St. spinosum*, Bréb., and *St. aculeatum*, Ehrb., both from Minneapolis, Minn.

ST. PANICULOSUM, *n. sp.* (Plate XXVII., Figs. 3 and 3*a*, front and end views.)—Cell sexangular, as long as wide; semicells truncated triangles, angles rounded; inferior angles bearing two short, straight aculei; end view triangular, one aculeus visible on each rounded angle; sides moderately convex; membrane punctate, punctules in radiating lines. Diameter, 40μ–50μ.

Marsh pool near Bethlehem, Pa.

ST. DUPLEX, *n. sp.* (Plate XXVII., Figs. 10 and 10*a*).—Of equal length and breadth, subquadrangular; constriction deep, enlarged outwardly; angles rounded, furnished with two short, stout processes, ends truncate, granulate or spinous; end view triangular, sides straight or concave, angles divided and drawn out into two short, somewhat divergent processes, ends furnished with three or four very small teeth. Diameter, 20μ–25μ.

Pools on shore of river, Bethlehem, Pa.

The end view has a resemblance to Nordstedt's *St. gemelliparum*, but the front view is distinct.

ST. EXIGUUM, *n. sp.* (Plate XXVII., Figs. 23, 23*a* and 23*b*.)—Very small, smooth or punctate; semicells subcuneate, sides slightly rounded, ends truncate; superior angle produced into straight, divergent arms nearly as long as the diameter of the cell; ends forked; viewed from the end, triradiate. Diameter, including arms, 20μ–25μ.

Frequent in ponds, Mount Everett, Mass.

This minute form is nearest *St. gracile*, Ralfs, but differs in its smaller size and smoother membrane.

St. leptocladum, Nord., var. SINUATUM, *n. var.* (Plate XXVII., Fig. 24).—Differs from the typical form in the arms being more divergent, and in the emarginate apex.

ST. ELOISEANUM, *n. sp.* (Plate XXVII., Figs. 9 and 9*a*, front and end view.)—Small, equal in length and breadth, smooth or finely punctate; sinus produced by the constriction an acute angle; semicells subhexagonal, basal and superior angles produced into two short processes; bifurcate at the ends; end view circular, margin with nine (usually) short processes, ends notched. Diameter, 22μ–30μ.

Minneapolis, Minn.

This plant has some resemblance to *St. spinosum*, Bréb., but the processes are less conspicuous and the apices less distended. The end view is entirely distinct in being circular.

St. megacanthum, Lund., var. CONVERGENS, *n. var.* (Plate XXVII., Figs. 13 and 13*a*, front and end views.)—Unlike those of the typical form, the aculei are convergent and sometimes cross each other, being set nearly at right angles with the long axis of the semicells. The plant is also somewhat smaller. It reminds one of *St. Dickiei*, Ralfs, but it is not so turgid, and the aculei are much longer and stouter. Diameter, without the aculei, 38μ-45μ.

Minneapolis, Minn.

ST. TRIHEDRALE, *n. sp.* (Plate XXVII., Figs. 20 and 20*a*, front and oblique views).—Small, punctate granulate; semicells, in front view and in end view, triangular, angles rounded, sides concave, sinus narrowly linear. Diameter, 30μ.

Pond, Mount Everett, Mass.

This species, in its front view, partakes much of the appearance of a *Cosmarium*, near *retusum*, Perty, and *angustatum*, Nord., but the side and end views are distinct. The semicells are three-sided pyramidal forms unlike those of a *Cosmarium*.

St. vestitum, Ralfs., var. DISTORTUM, *n. var.* (Plate XXVII., Figs. 15 and 15*a*).—Separated from the typical plant by its unsymmetrical form, irregularly arranged vesture, and deeply notched margins.

Collected in the vicinity of Minneapolis, Minn.

St. Sebaldi, Reinsch, var. SPINOSUM, *n. var.* (Plate XXVII., Fig. 11).—The spine protruding near the margin of the sides of each semicell is a peculiarity worthy of note.

Minneapolis, Minn.

St. furcigerum, Bréb. (Plate XXVII., Figs. 5 and 5*a*, end and front view).—This plant is figured as a specimen of a variety. It differs from the many forms observed heretofore, in the triradiate arrangement and the long arms on the centre of the cells in the end view. The arms are usually six in number, and much shorter.

Minneapolis, Minn.

TOLYPOTHRIX, Ktz.—*T. tenuis*, Ktz. Ann Arbor, Mich., collected by J. Reighard; and Plainfield, N. J., collected by A. D. Balen.

CALOTHRIX, *Ag.*—*C. mirabilis* (Dillw.) Ag. Minneapolis, Minn. Thuret claims this plant for his new genus *Plectonema*. The present plant is a true *Calothrix* and answers to the diagnosis of *mirabilis*.

HYPHEOTHRIX, Ktz.—*H. luminosa*, Rab. Ponds, Pennsylvania.

ANABÆNA, Bory.—*A. circinalis*, Rab. Floating on a pond, Minneapolis, Minn. A distinct variety.

New Species of Grasses.

By GEORGE VASEY.

AGROSTIS TENUIS.—Perennial, loosely tufted. Culms 6 to 10 inches high, slender, somewhat geniculate below; leaves 1 to 2 inches long, narrow, about 2 on the culm; ligule short. Panicle pyramidal, open, 2 to 3 inches long and 1 to 1½ wide; rays in threes or fives below, above in twos or single, capillary, the longest an inch or more in length, flowering above the middle, spreading or erectish. Spikelets very small (less than a line long); glumes acute, purplish, lower one a little shorter and broader; flowering-glume thin, obtusish, 3-nerved above, a little shorter than the outer glumes, unawned; palet very minute or wanting.

Collected on the San Bernardino Mts., California, by the Parish Brothers.

AGROSTIS HUMILIS.—Perennial, tufted. Culms 4 to 6 inches high, naked above, 1 to 2 leaves below the middle; leaves mostly at the base, 1 to 2 inches long, narrow, not rigid, mostly erect; ligule short, auricled. Panicle 1 to 1½ inches long, narrow and few-flowered, branches short, mostly in threes below, above in twos or single, appressed, the larger branches subdivided and with two to five spikelets. Spikelets purple, less than a line long, outer glumes ovate-lanceolate, acute, smooth; flowering-glumes nearly as long as the outer ones, five-nerved, minutely toothed at the apex, unawned; palet hyaline, two-thirds as long as its flowering-glume.

Has the appearance of small forms of *A. varians*, but that species has *no* palet. Found by W. N. Suksdorf on Mt. Paddo, Washington Territory, and by Mr. Howell on Mt. Adams. Grows in compact tufts in moist places.

New Western Lichens.

By EDWARD TUCKERMAN.

LECIDEA BRANDEGEI, *sp. nov.*—Thallus rugose-plicate, straw-colored; apothecia ample (1$^{mm.}$,5 to 3$^{mm.}$ in width), beneath mostly free, flat, soon becoming wavy, the disk very black and opake, the originally pale margin soon blackening and lobulate-crenate, bright, and then demiss and disappearing, the hypothecium colorless. Spores short-ellipsoid, simple, 0,06–11$^{mm.}$ long, and 0,004–6$^{mm.}$ wide. Spermatia short-acicular, more or less bowed, 0,010–16$^{mm.}$ long, and less than 0,001$^{mm.}$ in thickness. Paraphyses distinct at length, and bluish- then brown-capitulate.

Upon rocks, Rocky Mountains, near St. Elmo, Colorado, T. S. Brandegee, in herb. Sprague. With the features, originally, of *Lecanora*, and the apothecia always showing, in section, the gonidial layer; but the natural affinity of the lichen is none the less with the

next following; to which, indeed, it is as close, as it is well-marked in its differences from it.

LECIDEA PRINGLEI, *sp. nov.*—Thallus pulvinate (reaching, in the specimens, about half an inch in height), composed of crowded, branched trunks, which are dilated above and densely plicate-rugose, and pass at the base into root-like branchlets, from pale to dark green, and finally black and shining; apothecia ample to very large (2–6 mm. in width), a little elevated, flat, soon wavy and lobed, and at length variously irregular, the disk from rufous-fuscescent very black, excluding the demiss, at first pale, but soon black and shining, stout margin, the hypothecium colorless. Spores from broad- soon oblong-ellipsoid, simple and pseudo-bilocular, 0,010–12$^{mm.}$ long, and 0,003–5$^{mm.}$ wide. Spermatia filiform, now bowed, 0,018–24$^{mm.}$ long. Paraphyses conglutinate.

Rocks, Sierra Nevada, California, C. G. Pringle, in herb. Sprague. On the eastern slope of the Cascade Mountains, Washington Territory, Brandegee, in the same herbarium. The lichen last-named is strikingly differenced from that of the Sierra Nevada by the extension of the trunks upward into slender, naked stems, only at the summits expanding into the plicate state, with something of the habit and at length color of *Alectoria ochroleuca*, f. *nigricans*. The hypothecium in this species, as in *L. Brandegei*, rests on the gonimous layer, and the feature is much more pronounced and constant here than it seems to be in *Lecidea conglomerata* of Europe. But I take the latter (in which also the apothecium is originally lecanorine, though ultimately quite lecideine) to be the key to the position of both these better developed American lichens.

ACOLIUM STI. JACOBI, *sp. nov.*—Thallus of white granules soon compacted into a chinky crust; apothecia of middling size in this genus (in the solitary specimen 0$^{mm.}$,5–8 in width, and about the same in height), of the substance and color of the thallus, more or less turbinate, the interior exciple yellow, the disk more or less protruded, black, but yellowish-green at the surface. Spores (no thekes observed) rounded and short-ellipsoid, bi-locular, 0,020–40$^{mm.}$ long, 0,016–30$^{mm.}$ wide.

On the earth in "mesas," San Diego, California, C. G. Pringle, in herb. Sprague.

PYRENOTHAMNIA, *Genus nov.*

Apothecia immersed in the thallus, the perithecium fuscescent, the amphithecium colorless, the paraphyses diffluent and obsolete. Spores in saccate-clavate thekes, ellipsoid, solitary, or in twos, or in fours, 0,030–56$^{mm.}$ long, and 0,016–24$^{mm.}$ wide. Hymenogonia oblong, guttated, 0,010–24$^{mm.}$ long, and 0,003–4$^{mm.}$ wide. Thallus fruticulose, cæspitose (about half an inch high, the width of the branches 2–4$^{mm.}$, the thickness 0,002–3$^{mm.}$), fragile, from a teretish base dilated above, and dichotomously much-branched, the obtuse tips crenate-dentate; the color from cinerascent fuscescent. Hyphæ forming a confused layer; the thalline gonidia 0,006–0.012$^{mm.}$ in diameter.

P. SPRAGUEI.—On the earth, "growing in masses on the eastern

slope of the Cascade Mountains, Washington Territory, alt. 3,500–6,000 ft.;" T. S. Brandegee, in herb. Sprague. Spermogones do not appear. The general aspect is distantly comparable with that of *Siphula torulosa*, and the nearly akin *S. coriacea* (Tayl.) Nyl. A fruticulose manner of growth is so very remarkable in the Verrucariacei that the present lichen must be separated from all sections of *Endocarpon*, whether or not the generic rank be maintained. It is appropriately inscribed to the unwearied cryptogamist, my ever liberal friend, C. J. Sprague, Esq., who has especially directed research into the lichen-flora of the Pacific coast.

A New Species of Oxytheca.

By C. C. Parry.

Since the summer of 1881 the writer has had under inspection, from two successive years' collections, in abundant specimens showing all stages of development, an anomalous plant of the Eriogoneæ group, found in that district of curious vegetable forms, the Mojave Desert of Southern California.

Unwilling to decide on its true relations with the other members of this extensive and peculiar Western American family without a careful examination of all the accessible allied genera, I was for some time inclined to regard it as the type of a new genus, to which, at the suggestion of Prof. Asa Gray, I applied the provisional name of *Gymnogonum spinescens*, ined. Under this name, herbarium specimens have been sparingly distributed.

Later, in correspondence with Mr. Sereno Watson on this subject, he suggested that by a very slight modification of the generic character of *Oxytheca*, the plant might appropriately come into that genus. In deference to his judgment, as well as in accordance with my own more matured convictions, I have finally adopted this view, and, suppressing the unpublished herbarium name of *Gymnogonum spinescens*, I present herewith a description of the plant as follows:

Oxytheca luteola, *n. sp.*—Plant prostrate (3 to 10 inches broad), dichotomously branched from the base, smooth, or with scattered pubescence on the slender branches; leaves orbicular to oblong-obovate, 1½ to 2 lines in width, with slender petioles three or four times as long, covered below with dense woolly pubescence, smoother above, the cauline in one-sided pairs (the third at each node obsolete or nearly so), one or both passing into linear-aciculate bracts; involucres sessile, 5-parted, the spreading unequal divisions resembling the bracts, the longer 2 to 5 lines in length (including the slender awn) and about equalling the bracts; flowers pubescent, crowded (7 to 15), developing centripetally, the short pedicel jointed at the base of the perianth and subtended by two bractlets, one linear, the other broader and scarious; perianth 6-cleft nearly to the middle, greenish-yellow; filaments short; anthers short-oval; styles short, with spreading capitate stigmas; akenes smooth; cotyledons orbicular, accumbent to the longer radicle.

Habitat.—Growing on moist, sandy soil near Lancaster Station, on the Mojave Desert, June to August; No. 259, C. C. Parry, Pacific

Coast Flora, 1881. Distinguished from other species by the more rounded long-petiolate leaves, which, as well as the bracts, are mainly in pairs instead of ternate (as occurs more or less frequently in some other species), by the closely sessile and unequally parted involucres, and by the yellowish flowers; in all other respects according with the the generic character, thus increasing the accepted species of the genus to eight.

The Bulbs of Epilobium palustre.—Those who wish to see the bulbs of *Epilobium palustre*, L. (the *E. squamatum* of Nuttall) may find them in moist low grounds when they first appear in spring. Later, the fleshy scales of the bulbs decay and disappear. In autumn, they are found at the ends of slender stolons attached to the parent root. They are then about an inch long, of a dusky flesh-color, the scales regularly overlapping each other along the axis of growth, with the bud at the end. The roots spring from between the scales, and, as the latter decay as soon as their nutriment is absorbed by the growing plant, there are no bulbs to be seen by the time the flowers appear. The same bulbs appear on *E. molle*, Torr., and possibly on all the rest of the family.

LUCY A. MILLINGTON.

Distribution of Weeds.—Among the means whereby weeds are distributed, their being generally objectionable to cattle should not be overlooked. When in North Carolina, I noticed that wherever *Verbesina Siegesbeckia* had to struggle unaided with other native vegetation there were only plants here and there among scores of other species of vegetation. When it was growing in a pasture or along the roadside where cattle ate, it soon took possession of the whole surface, simply because cattle kept other species from seeding, while avoiding this, and thus it had the whole ground to itself. It is very often an argument that an introduced plant is better adapted to the new location than the native, because it seems to spread so rapidly; but in most cases it may be because cattle will not touch it, and there happen to be few other competitors of its class. It gets the whole field to itself. The ox-eye daisy and the buttercup spread so amazingly quite as much because cattle let them go to seed as that the climate or soil is unusually favorable. Around our large cities, *Stramonium*, wild chamomile, Canada thistle, wormseed and other well-known weeds spread only because goats, sheep, cows and geese avoid them, and they have thus nothing to interfere with their rapid spread. These remarks are suggested by an idea thrown out in a foreign periodical I have just been reading, that the great spread of some European weeds in America is a proof that they have found a soil and climate superior to those "for which they were specially created."

THOMAS MEEHAN.

New Species of Ferns.—In our next number, Prof. D. C. Eaton will describe some new United States ferns, give new stations for a number of old species, and notice Prof. Lemmon's very interesting discoveries made last August in Arizona.

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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, March, 1883. [No. 3.

On Three Hybrid Oaks near Washington, D. C.

By GEORGE VASEY.

(Plates XXVIII.—XXX.)

Hybrid No. 1, *or "Saul's Hybrid."* (Plate XXVIII.)—This tree is growing on the premises of Mr. John Saul, a nurseryman and florist, about two miles north of the city. It is growing in a thicket mostly composed of white and red oaks and chestnuts. The tree towers up to the height of some fifty feet. The general appearance of the trunk and branches suggested to me a young *Quercus rubra*, but a glance at the leaves and fruit referred it at once to the white oak group. But the bark does not have the usual whitish color and scaly character of the white oak. The bark of *Quercus stellata* (post-oak) is closer and less scaly than that of the white. The bark of the true *Quercus Prinus* is still closer, harder and darker colored, and on the branches is quite smooth. The bark of this hybrid appears to combine the qualities of *Quercus alba* and *Q. Prinus*. The leaves are mostly five or six inches long, with an average breadth of about two inches, mostly acute and narrowed at the base, and with a pretty uniform width of outline. There are six or seven lobes on each side, pointing with a strong and uniform angle toward the apex. The sinuses are mainly about an inch deep, reaching within half or three-fourths of an inch of the midrib. The lobes are remarkably uniform in size, breadth and direction. The upper surface is of a dark, glossy green, the under surface of a bluish-white or glaucous color, and smooth. The petiole is an inch to one and a half inches long, flexible, and of a yellowish color, as in *Q. rubra*. In texture, it is a little thicker than in *Q. alba*. The acorns are like those of *Q. Prinus*, averaging nearly as large, and with the same tuberculated cup. There is seldom more than one matured on a twig, and they have a pretty stout pedicel of half an inch in length. Growing under the tree there are two young trees or bushes about eight feet high, which apparently are seedlings from it. In this, as in most other oaks, the leaves on the lower branches and the leaves of the sprouts differ considerably from those of the upper and fertile branches, being broader and more irregular in lobation. It is difficult to fix the parentage of this tree, but the acorns point unmistakably to *Quercus Prinus*, and the leaves we may suppose to combine the characters of *Q. Prinus* and *Q. alba*. Dr. Engelmann thinks it may be a new variety of *Q. Prinus*.

Hybrid No. 2. (Plate XXIX.)—This tree is growing about six miles north of Washington, near Silver Spring Station, and close by the roadside. In fact, there is a clump of three trees, evidently

sprouts from an original tree, which was cut down probably twenty-five years ago. The three trunks are of about equal size—about twenty feet high—and branch within six feet of the ground. The bark is closer and darker colored than that of the white oak. The leaves in outline, but not in lobation, are much like those of the Saul's hybrid, being six or seven inches long, and narrow, with about four pairs of lobes; most of the sinuses reaching within half an inch or less of the midrib. The base of the leaf is generally obtuse and rounded, gradually widening for an inch or more to the first pair of lobes, which are scarcely more than coarse teeth. The remaining lobes are rather irregular, there being usually two or three pairs of large ones of about an inch in length each, then a pair of small short ones or teeth, ending in a narrow acutish point of about half an inch. The middle pair of lobes is the longest and broadest, making the greatest breadth of the leaf, which is about two inches. The under surface of the leaf is of a light gray, with a minute and sparse pubescence. The lobes generally point strongly forward, but frequently one or two diverge nearly at right angles. The upper surface is smooth, dark green, and the texture is considerably thicker and firmer than in *Q. alba*. The petiole is about an inch long, narrow, but less flexible than in No. 1, and destitute of the yellowish color. The acorns mature mostly in twos, and the common peduncle is about half an inch long, and thick. The acorns are about the size and form of those of *Q. alba*, the cup covering about one-third, with a thin edge, and with close smoothish scales. This tree seems to show a mixture of *Q. alba* and *Q. stellata*, with a preponderance of *Q. alba*.

Hybrid No. 3. (Plate XXX.)—This tree grows close by the roadside about two miles north of the city, near what is called Piney Branch. It is, perhaps, twenty-five feet in height, and the trunk a foot in diameter. The bark and general habit of the tree is much like that of *Q. stellata*, the bark being close and dark in color. The leaves, in length, are five or six inches, slightly shorter than in hybrids numbers one and two, and broader. There are about five pairs of lobes, of which the third and fourth are the largest and broadest. They are coarser and wider, and have greater divergence than in the others, and the central part of the leaf is broader. The lower surface is grayish, rougher and more pubescent than in number two. The upper surface is of a dark shining green. The leaf is firmer in texture than in either of the others; the petiole is stiffer; and in outline, rigidity and roughness it shows an evident approach toward *Q. stellata*. The same relationship is manifested in the acorns, which are broader and more depressed than those of *Q. alba*, evidently approaching those of *Q. stellata*, but much larger. In other respects it is *Q. alba*.

New or Little-Known Ferns of the United States. No. 13.

By D. C. Eaton.

43. *Polypodium thysanolepis*, Al. Braun.—Rootstock creeping, densely scaly; stalks two to six inches long; fronds as long as the stalks, ovate in outline, sub-coriaceous, slightly scaly above, clothed

beneath with ovate reticulated ciliate scales, pinnatifid into rather few oblong or oblong-spatulate entire segments separated by broad rounded sinuses; veinlets anastomosing in a single series of large areoles, each areole enclosing a sorus, outer veinlets free.—Baker, Syn. Fil., ed. 2, p. 512.

Collected on the Huachuca Mts., Arizona, by Prof. and Mrs. Lemmon in August, 1882.

This is a well-known Mexican fern of the same group with *P. incanum*, from which it differs by its usually larger size, its fewer, broader and more distant segments, and especially by the heavier covering of larger, laxer and beautifully ciliated scales. It is No. 971 of Parry and Palmer's collection of 1878, from San Luis Potosi, and No. 210 of Ghiesbreght's Chiapas distribution.

44. NOTHOLÆNA CALIFORNICA, *n. sp.*—Rootstock short; stalks clustered, two to four inches long, black, wiry, when young scaly with lanceolate dark-brown rigid scales; frond one to two inches long, broadly deltoid-ovate or pentagonal-ovate, from a quadri-pinnatifid base gradually simpler to the apex; ultimate segments oblong or triangular-oblong, small (1–2 lines long) and very numerous and crowded; upper surface minutely glandular; lower surface copiously farinose with yellow or whitish powder, except on the strong blackened rachis and midribs; margins more or less recurved, but not covering the copious dark-brown sporangia.

San Diego Co., California, Miss Burbeck, Mr. Cleveland and Mr. Stout. Colorado desert, Dr. Parry. Arizona, Prof. Lemmon.

This plant I have for a long time confused with *N. candida*, Hook., as at pp. 22 and 23 of the second volume of Ferns of North America, where it is spoken of as the Californian form of that species. It has smaller and more compound fronds than *C. candida*, and occupies in the genus a position about midway between that species and *N. Chilensis*. The powder is so abundant that it is sometimes difficult to glue a specimen to paper.

45. *Notholæna Aschenborniana*, Klotzsch.—Rootstock short, creeping; stalks clustered, dark-chestnut, copiously beset at the base with rigid blackish ciliated lanceolate-acuminate scales, which become more delicate higher up the stalk, and pass into a dense whitish or pale-ferruginous tomentose mass which covers the frond; fronds 4–10 inches long, pinnate, the pinnæ an inch long or less, rarely more, pinnatifid into very numerous sessile, oblong, entire or crenately lobed obtuse segments, upper surface at length becoming smoothish, the lower indistinctly farinose beneath the heavy coating of ciliately cleft scales; sporangia forming a dark line around the edges of the segments.—Klotzsch, in *Linnæa*, xx., p. 417.

This was first gathered near Chepultepec, in Mexico, by Alwin Aschenborn. Fournier (Pl. Mex., Crypt., p. 124) gives among the localities "Texas, Trécul, No. 1,456, Drummond, No. 354." Dr. Edward Palmer found it in the mountains east of Saltillo, Nuevo Leon, Mexico, in 1880; and now it is found and identified by Mr. Davenport among some unnamed ferns sent by Prof. Lemmon from the Huachuca Mts. It has a decidedly less compound frond than *N. Newberryi*, and may be easily recognized by the beautifully

ciliated scales, soft and tomentose on the pinnules, but gradually more and more rigid towards the rootstock, where they are hard and nearly black.

46. *Pellæa marginata*, Baker.—Stalks tufted, slender, castaneous, shining; fronds four to six inches long and nearly as broad, deltoid in outline, tri-quadri-pinnatifid, segments linear-oblong, chartaceous; smooth; involucre broad, continuous, delicate, the margin slightly erose.—Syn. Fil., p. 151. *Cheilanthes marginata*, Hooker.

Huachuca Mts., Arizona, Prof. and Mrs. Lemmon, August, 1882. Common in Tropical America from Mexico and the West Indies to Peru. It is often difficult to distinguish between this and *P. angustifolia*, though the latter has commonly a less decompound frond, and longer and more distant ultimate segments.

47. *Cheilanthes Alabamensis*, Kunze.—Huachuca Mts., Arizona. Prof. and Mrs. Lemmon, August, 1882. A more western station than any before reported.

48. *Cheilanthes lendigera*, Swartz.—Rootstock cord-like, creeping, covered with soft narrow scales; stalks rather distant, 4–8 inches long, at first loosely tomentose with ferruginous hairs, at length castaneous and nearly smooth; fronds as long as the stalks, ovate-oblong, thrice to four times pinnate, ultimate pinnules cuneate-obovate, less than a line long, the margin recurved and the white involucre leaving but a small opening in the middle, making the pinnules pouch-like; upper surface green and naked, the lower hairy.—Hooker, Sp. Fil., ii., p. 95, t. civ., B.

Huachuca Mts., Prof. and Mrs. Lemmon.

This is another well-known species of Mexico and the Andes of Colombia and Ecuador. It is much less woolly than *C. tomentosa*, and the pouch-like ultimate pinnules are very noticeable.

49. *Asplenium montanum*, Willd.—This must now be considered a New England fern. One day last April three students of the Academy at Norwich, Conn., started out for a day's search for "trailing-arbutus, lichens and rocks.' Messrs. Fuller and Setchel found this fern in clefts of rocks on Lantern Hill, which rises between the towns of Ledyard and North Stonington. Mr. Fuller first saw the plant, Mr. Setchel identified it, and Mr. Collin has the honor of being one of the party.

About Christmas, 1882, Mr. C. B. Graves, of New London, also discovered the plant on the same mountain, and also on a smaller hill distant a little way to the north-east. Mr. Graves says it is not uncommon in holes and crevices of the rock. It is to be hoped that the difficulty of getting to the place will long prevent the extirpation of the fern.

50. *Asplenium monanthemum*, L., was found among Prof. Lemmon's Huachuca ferns by Mr. Davenport, who has sent me three fronds. They are all rather smaller than common Mexican specimens. One of them has uniformly monosorous pinnæ, one shows here and here a second sorus, and the third has regularly three or four sori on most of the pinnæ. Usually this fern has decidedly larger and more erect fronds than *A. Trichomanes*, and the few large sori are along the lower edge of the pinnule.

51. *Asplenium Glenniei*, Baker, described at p. 488 of the second edition of Synopsis Filicum, was scantily collected on the Huachuca Mts. by Prof. Lemmon. It is a small fern growing in little tufts like *A. montanum;* but the fronds are lanceolate, tapering both ways, 2–6 inches long, pinnate, with many pairs of oblong, toothed or pinnately lobed deep-green pinnæ. The sori are abundant, rather large, slightly curved outwards, and placed mostly very near the midrib of the pinnules. The fern comes near the old world *A. fontanum*, but is not closely allied to any of our common species. I am obliged to Mr. Baker for the identification.

52. *Aspidium juglandifolium*, Kunze.—The free-veined form which has been called *Phanerophlebia nobilis*, is in Prof. Lemmon's Huachuca collection. This was found in Western Texas many years ago, but has never been distributed to herbaria from any station within the borders of the United States. With this, Prof. Lemmon secured a few fronds of *Aspidium Filix-mas* and a few of an *Aspidium* with decompound fronds, the species not yet clearly recognized.

A List of Grasses collected by Mr. C. G. Pringle in Arizona and California, with descriptions of those species not already described in American publications.*

62. *Cottea*† *pappophoroides*, Kunth, Gram., i., 84.281. t. 52; Enum. Pl. i. 256; Steud, Syn. Pl., i. 201.

Perennial. Culms erect, branched at the base, 2 feet high, smooth below, pubescent above, especially at the joints and on the main axis and branches of the panicle. Leaves flat, 2–3 lines wide, 5–8 in. long, involute towards the tip; sheaths loose, pubescent like the leaves; ligule a ciliate ring of short hairs. Panicle lanceolate in outline, 6–8 in. long, the more or less spreading branches solitary, the lower ones about 2 in. long, branched a little below the middle, the branchlets 1–3-flowered. Spikelets about 4 lines long, exceeding their pedicels; outer glumes lanceolate, 2½ lines long. Flowering-glume 2 lines long, striate with 9 prominent nerves and several intermediate less prominent ones, the two lateral divisions more deeply cut than the others and somewhat divergent; the three longest awns a little over a line in length. The edge of the flowering-glume, for a short distance above the base, is densely pilose with hairs a line long.

Near Tucson, Arizona, Dec. 7th.

This is the same as No. 2,057 of Wright's N. Mex. collection, 1851–2. Mr. Pringle found only a single specimen, which is an old one, but sufficiently perfect to show the above-enumerated charac-

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* Continued from page 145, Vol. ix.

† COTTEA, Kunth.—Panicle open; spikelets 6-9-flowered, the upper imperfect. Outer glumes 2, membranaceous, concave, many-nerved, the lower one 3-lobed at the tip, lobes acute-mucronate, the upper one a little smaller, entire, acute. Flowering-glume 5-cleft, the lateral lobes deeper than the others, concave, sub-11-awned, awns continuous, straight, unequal, three longer than the others. Palea bicarinate, apex bifid, lobes acute-mucronate. Stamens three. Ovary smooth. Styles 2, terminal. Stigmas plumose. Grain oblong, nearly terete, smooth and freely enclosed within the palea.

ters. The genus has but the one species, which extends southward into Peru.

63. **Triodia mutica*. *Tricuspis mutica*, Torr., Bot. Whipple, p. 156; Porter and Coulter, Syn. Flor. Colorado, p. 148.=No. 2,046, C. Wright, N. Mex., 1851–2.

No locality given for Mr. Pringle's specimens.

64. *Triodia pulchella*, HBK., Nov. Gen. i., 155, t. 47; *Tricuspis pulchella*, Torr., Pac. R. R. Surv., iv., 156; Thurber, Bot. Cal., ii., p. 301.

65. DIPLACHNE VISCIDA, *n. sp.*—Similar in habit and inflorescence to *D. fascicularis*, P.B., but smaller throughout and "covered with acrid viscid glands." Panicles from one to three inches long, sessile in the axils of the leaves, and mostly enclosed by the inflated sheaths, densely flowered, the erect or ascending branches rarely exceeding an inch in length. Spikelets about 2 lines long, nearly sessile, 4–6-flowered: Outer glumes lanceolate, acute, the lower a line long, the upper a little longer and larger. The first flowering-glume about 1¼ lin. long, shortly ciliate below on the central and lateral nerves, scabrous above, two-lobed at the tip, lobes rounded-obtuse, the central nerve produced between them into a scabrous awn one-half a line long. Spikelets often reddish or purplish, as well as the culm and leaves.

Santa Cruz Valley, near Tucson, Arizona. June 28th, 1881.

This grass may have been introduced from Mexico or from regions farther south, since, as Mr. Pringle states, it grows in valleys which are inhabited. Mr. Pringle is inclined to the opinion, however, that it is indigenous to the region where he gathered it. It is not improbable that it has already been described in works not accessible, treating of more Southern plants.

66. *Diplachne dubia*. *Leptochloa dubia*, Nees in Mart. Brazil, ii., p. 433; Chapman in Flor. So. States, p. 559.

Fuller's Ranch, Arizona. July.

67. **Diplachne imbricata*. *Leptochloa imbricata*, Thurber, Gram., Mexican Bound. ined.; Bot. Calif., ii., p. 293.

Santa Cruz Valley, near Tucson. July.

This is the same as No. 404 of E. Palmer's Coll., 1875.

68. *Eatonia obtusata*, Gray, in Manual, 5th ed., p. 626.

Near Tucson, Arizona.

69. **Eragrostis Purshii*, Bernh., var. *delicatula*, Munro. *E. diffusa*, Buckley, in Proc. Phil. Acad., 1862, p. 97.

Santa Cruz Valley, near Tucson.

This grass was distributed as var. *diffusa* of *E. Purshii*.

70. *Eragrostis pilifera*, Scheele. Steudel, Syn. Glum., p. 278.

Santa Catalina Mts., Arizona. April.

This grass has been proposed as a variety of *E. pectinacea*, Gray, some forms of which it resembles in habit and inflorescence, but the spikelets are narrow and less flattened, and the lateral nerves of the more obtuse flowering-glume are obsolete.

71. *Melica aristata*, Thurber, in Bolander's revision of the Meliceæ, in Proc. Calif. Acad. Sci., iv., part 2, p. 102; Bot. Calif., ii., p. 305.

Mt. Shasta, Cal., alt. 6,000 feet. August.

72. *Melica fugax*, Boland., Proc. Calif. Acad., iv., p. 104; Thurber Bot. Calif., ii., p. 304.

Mt. Shasta, Calif., alt. 6,000 feet. August.

A tall form with a racemose few-flowered panicle.

73. *Distichis maritima*, Raf. Thurber, Bot. Calif., ii., p. 306.; *Brizopyrum spicatum*, Hook.; Gray, Manual, p. 628.

Santa Cruz Valley, near Tucson.

74. *Poa Californica*. *Atropis Californica*, Thurber, Bot. Calif., ii., p. 309.

Santa Rita Mts., Arizona, alt. 4,500–6,000 feet. April.

Both the male and female plants are represented.

75, 76. *Poa*—probably forms of *P. tenuifolia*, Nutt. The first, from the mountains about the head-waters of the Sacramento River, has a stout culm with flat radical and cauline leaves, 2-4 in. long, the outer glumes obtuse, the upper one over 2 lines long, equalling the first floret; the second, from Mt. Shasta, more nearly approaches the typical form of the species.

77. **Poa annua*, L., var. *stricta*, Vasey. Panicle narrow, 3–5 in. long with erect branches. Truly indigenous.

Banks of the Rillita.

78. Poa Pringlii, *n. sp.*—Culms about 6 in. high, slender and scape-like, with a single leaf below the middle, densely tufted from a creeping root-stock, the base surrounded by the loose sheaths of the radical tuft of short (1–2 inches) convolutely folded, smooth and narrow leaves. The cauline leaf about ½ an inch long, narrow and folded like those at the base, minutely scabrous at the somewhat pungent tip. Panicle about an inch in length, narrow and few-flowered; lower branches in pairs, bearing one or two spikelets which they about equal in length. Spikelets 3–4 lin.long, 3–5-flowered. Outer glumes broadly lanceolate, three-nerved below, with broad scarious margins, the upper one about as long as the spikelet, the lower a ltttle shorter and smaller. Flowering glume about 3½ lines long, broadly lanceolate, with a broad scarious margin above, 5-nerved, minutely punctulate-scabrous all over and strongly scabrous on the midnerve above, smooth below. Pale one-fourth shorter than its glume. Scales broad and irregularly cut or toothed.

Mountains about the head-waters of the Sacramento River, California. September.

There is considerable variation in the size of the spikelets, which, in most specimens, are purplish in color and have a membraneous appearance. It is apparently dicœcious. The staminate plant is more slender, with more acute glumes.

The species is allied to *Atropis Californica*, Munro, but appears to be sufficiently well marked to be kept distinct.

79. *Festuca tenella*, Willd., Sp., i., 419; Gray, Manual, p. 633.

By streams of the Santa Catalina Mts.

80. **Festuca microstachys*, Nuttall, Plant. Gambel, 187; Thurber, Bot. Calif., ii., p. 317.

By streams of the Santa Catalina Mts.

81. *Bromus Hookerianus*, Thurber, Bot. Wilkes's Exped., 493; *B. virens*, Buckley, in Proc. Phil. Acad., 1862, 98; *Ceratochloa grandi-*

flora, Hook. Flor. Bor. Am., ii., 253, t. 235; Thurber in Bot. Cal., ii., p. 321.

Mountains about the head-waters of the Sacramento River, alt. 7,500 feet. August.

This seems to be the same as No. 648 of E. Hall's Oregon collection, ticketed "*Bromus* (*Ceratochloa*) *carinatus*, Hook., var."

82. *Agropyrum caninum*, Reichenb., Icon. Fl. Germ., t. 119; *Triticum caninum*, L.; Gray, Manual, p. 638.

Santa Rita Mts., Arizona. July.

This is the form "differing from the type in its large and spreading, usually much crowded spikelets, and its long, stout and divergent awn," referred to by Dr. Thurber in his remarks under *Triticum caninum*, in Bot. Cal., p. 324. It is certainly very distinct from the ordinary forms of the species, and should at least have a varietal name—say var. MAJUS.

83. *Hordeum nodosum*, L. Thurber Bot. Cal., ii., p. 325; *H. pratense*, Huds.; Gray, Manual, p. 638.

Santa Cruz Valley, near Tucson.

84. *Elymus Canadensis*, L. Gray, Manual, p. 639.

By streams of the Santa Rita Mts.

85. **Elymus Sitanion*, Schult. Thurber, Bot. Cal., ii., 327; Watson Bot. King's Exped., 391; *Sitanion elymoides*, Raf.; *Ægilops Hystrix*, Nutt., Gen., i., 86.

Santa Rita Mts., Arizona. May.

Girard College, Philadelphia. F. LAMSON SCRIBNER.

Note on Cyperus refractus, Eng.—For several years past I have frequently collected in this locality a *Cyperus* which I could not make correspond with any species in Gray or Chapman. On a recent visit to Cambridge I took occasion to look up the subject, and found, in Dr. Gray's herbarium, specimens of the same species with the manuscript name of *Cyperus refractus*, Eng. On calling Mr. Watson's attention to it, he recalled the fact of its publication under that name in *Linnæa*, Vol. xxvi., p. 369, in the description of the Cyperaceæ of the Berlin Herbarium, the type specimen having undoubtedly been furnished by Dr. Engelmann. It is probably the same plant as is described in Steudel as *Cyperus retrofractus*, Eng., but is not the *C. retrofractus* of Torrey. It is a tall, strong plant, 2 to 3 feet high, with from 5 to 10 unequal rays, the longest frequently 10 inches, naked except 1 or 1½ inches at the extremity. The spikelets are 8 to 10 lines long, about 6-flowered, spreading horizontally and becoming retrofracted. The nutlets are triangular, linear-oblong, about 1¼ lines long. It is undoubtedly pretty widely diffused in the country.

Washington, D. C. GEO. VASEY.

Notes from Utah.—In "Fern Notes, VI.," Mr. Davenport speaks of *Aspidium Filix-mas*. This plant was discovered by me in August, 1882, in quantity in the Wasatch Mts., Utah, and it undoubtedly ranges through all the higher mountains of Colorado, Utah, Nevada, etc.

In the same locality, I found in great abundance the rare Utah ferns *Aspidium Lonchitis*, *Polypodium vulgare* (typical form and var. *occidentale*) and *Adiantum pedatum*. The last has remained till this year unseen since its discovery by Mr. Watson ten years ago. The specimens are the same robust ones that are so familiar in the dells of Iowa.

Cleome sparsifolia, Wats.—I have this in excellent specimens. Mr. Watson's specimens were evidently too old, as the figure in Bot. King does not represent the species accurately. The bracts (so conspicuous in the figure) are inconspicuous; they are seldom elliptical, and are always acute. The leaves (which should appear all over the figure, except at the very base) have petioles 6″ to 9″ long, and three oblanceolate, acute leaflets. The petioles gradually lengthen toward the base of the stem, where they are 1′ to 2′ long. The leaflets toward the base become shorter and less acute, till at the root they are spatulate-linear, very obtuse and mucronate. The siliques are often 18″ long. The plant is 2° or more high.

Salt Lake City, Utah. MARCUS E. JONES.

Notes on Michigan Plants.—At Adair, about eight miles west of St. Clair, I spent several weeks last summer, and made a series of notes relative to the flora of that region.

It is said to have been once covered with forests of the white pine (*Pinus Strobus*), but these were thinned out by the lumberers, and finally destroyed by a great fire which ravaged this section of country. I found, however, a few trees, 20–30 feet high, which may have grown from seeds dropped after the fire.

Instead of the old forests, dense growths of *Populus tremuloides*, *grandidentata* and *monilifera* have sprung up in many places and become characteristic of the burnt regions. An occasional *Betula lenta* and *lutea* is sometimes found. The result has been an irregular growth of timber, allowing the passage of the sun's rays and a consequent growth of many sun-loving plants, offering a striking contrast to the ancient sombre forests which usually meet our eyes at this time of the year. In marshy places are found *Ranunculus alismæfolius*, *Ludwigia polycarpa*, *Samolus Valerandi*, var. *Americanus*, *Myosotis laxa* and *Aspidium Noveboracense*. In clearings, *Gnaphalium purpureum* is not uncommon. *Epilobium spicatum* and *Erechthites hieracifolia* are the first to occupy burnt grounds. *Hypericum Canadense*, var. *majus*, *Rubus hispidus*, *Lonicera parviflora*, var. *Douglasii*, *Pyrola elliptica*, the crimson form of *Monotropa Hypopitys*, *Collinsonia Canadensis*, *Hedeoma pulegioides*, *Euphorbia hypericifolia*, *Spiranthes Romanzoviana*, *Oakesia sessilifolia* and *Osmunda regalis* belong to the flora. *Daucus Carota* has become naturalized in the country west of Adair. Only two trees of *Liriodendron Tulipifera* were observed. I also found an *Elodes* which, I think, explains the *petiolata* (?) in Wheeler and Smith's catalogue. It was sent at the time to Prof. Thos. C. Porter, and I think that the facts cannot be better stated than by copying the words he used: "It is the same thing which I collected years ago in Central Pennsylvania, and Garber on Lake Conneaut, Crawford Co., in 1868.

The broader and paler leaves give it an aspect different from *E. petiolata* of Maryland and further south; but then the *lower leaves taper into a distinct petiole*, and the upper, though broader at base and almost sessile, are *not clasping*. The calyx is only one-third the length of the mature capsule, and the sepals are more obtuse. I have no flowers to examine the union of the filaments. And yet, with all the characters of *E. petiolata*, I agree with you in suspecting it to be a variation of *E. Virginica*."

Diligent search by our Michigan friends for the flowering plant would soon settle the doubt.

Dayton, Ohio. AUG. F. FOERSTE.

Submersed Leaves in Limnanthemum.—The fact that thin root-leaves occur on *Nuphar pumilum*, Smith, and occasionally on *N. advena*, Ait., has long been known and is on record; but, that the floating heart (*Limnanthemum lacunosum*, Griseb.) may bear similar leaves, has, I believe, been hitherto unnoticed. However, in two specimens of this plant collected at Wellington, Nova Scotia, in 1879, there are found four such leaves, 3 by 2½ in., of a delicate texture, diaphanous, and of a light green color with a tinge of red. They show a well-marked venation, have a broader sinus than the floating leaves, and are borne on short petioles.

ELIZABETH G. KNIGHT.

The Flora of the Franconia Mountains.—I have just read in the September BULLETIN Prof. Bailey's notes concerning the flora of the Franconia Mountains.

After preparing the list to which he refers—published by Mr. Prime in the *Journal of Commerce*—I left the north country and did not return until late in the summer. But I then made some interesting additions to my catalogue.

On the borders of Lonesome Lake grows in great profusion the *Utricularia cornuta*. On the edge of Echo Lake, near the boat-house, I found the *Subularia aquatica*, mentioned in Gray as found there by Tuckerman. In addition to the orchids named in my list, and those mentioned by Prof. Bailey, I gathered *Habenaria psycodes*, *H. fimbriata*, *H. tridentata*, *Goodyera repens* and *Spiranthes cernua*. On the top of Bald Mountain, the bear-berry (*Arctostaphylos Uva-ursi*) grows plentifully; and I also found there the alpine variety of *Solidago Virga-aurea*. On the Bethlehem road, quite near Franconia village, I gathered the finest specimens of *Solidago squarrosa* I have ever seen, the stems fully five feet in height, and the spike of flowers more than a foot long. The prevalent *Aster* is the *acuminatus*, and I found its "depauperate, narrow-leaved variety on Bald Mountain, and the *macrophyllus* near the base.

Between the Profile House and Echo Lake I saw two *Nabali*, the *albus* and *altissimus*. *Lobelia Dortmanna* grows on the borders of Profile Lake.

Hartford, Conn. ANNIE TRUMBULL SLOSSON.

Bentham and Hooker's Genera Plantarum.—Part 2 of Vol. iii., completing the work, is nearly ready for publication. Those who wish to obtain this part, like the preceding, at trade price, through us, will please to send a notification to that effect to "The Curator of the Harvard University Herbarium, Cambridge, Mass., without delay.

ASA GRAY.

(The trade price in London for the new part is £1, 4, 0.—ED.)

Botanical Literature.

Supplement to Dr. Chapman's Southern Flora. University Press. Cambridge: John Wilson & Son. 1883.

Since the publication of Dr. Chapman's Southern Flora, in 1860, a large number of species has been discovered by various collectors within the region it embraces, and botanists have long felt the need of a work describing these additions. This *Supplement* is intended to include these, as well as certain species which were omitted in the Flora, and forms a most valuable contribution to North American botany. It contains 96 pages, with index, is printed in the same form and type as the Flora, and is paged in continuation with the latter, making a total of 698 pages. Seventy-eight genera are added to the Flora, and about 450 species and varieties are described. Some of these, however, must count as corrections to the first edition. *Scutia ferrea* is *Reynosia latifolia*, Griseb., in the Supplement; *Gallactia spiciformis*, var., is *G. filiformis*, Benth.; *Schœnolirion Michauxii* is *S. Elliottii*, Feay; *Panicum sanguinale*, var., is *P. serotinum*, Mx., and *Andropogon tetrastachys*, var., is raised to the rank of a species under the name of *Andropogon arctatus*, Chapman.

The following are proposed as new species: *Polygala Reynoldsæ*, Chapm.; *Petalostemon Feayi*, Chapm.; *Pinguicula Floridensis*, Chapm.; *Euphorbia Garberi* and *deltoidea*, Engel., ined.; *Croton Alabamensis*, E. A. Smith, ined.; *Tillandsia Houzeavi*, Morren, ined.; *Xyris setacea*, Chapm.; *Paspalum reimarioides*, Chapm., and *Andropogon maritimus*, Chapm.

Seven genera and fifty-five species of grasses are described. "*Pharus latifolius*, L. (?)," from the description, must be *P. glaber*, Kth. (*P. latifolius*, Trin., non L.); "*Sporobolus Domingensis*, Sw.," was distributed in Mr. Curtiss' sets as *S. purpurascens*, Hamilt. Although synonyms are very generally cited, adding much to the value of the work, they are omitted in the case of *Thurberia Arkansana*, Benth., a grass long known under the names *Greenia*, Nutt., and *Sclerachne*, Torr. "*Paspalum monostachyum*, Vasey, ined.," was referred by General Munro to *P. rectum*, Nees., "spicis longiore." "*Paspalum obtusifolium*, Raddi," No. 3,565 of A. H. Curtiss, is *P. platycaule*, Poir. No. 813 of E. Hall's Texan collection is the same.

A very satisfactory attempt is made to separate the various forms of *Panicum* that have been lumped together under *P. dichotomum* by Dr. Gray and others, and the following are recognized as species:

Panicum commutatum, Schultes (*P. nervosum*, Ell.), *P. sphærocarpon*, Ell., *P. consanguineum*, Kth. (*P. villosum* and *angustifolium*, Ell.), *P. laxiflorum*, Lam., and *P. ramulosum*, Mx., in part.

In the first edition, *Andropogon maritimus* was included in *A. scoparius*, with which it is closely allied. It is, however, a well-marked species. Mr. Isaac Burk has collected this grass at Cape May, New Jersey, and specimens of it are in hand.

The gentlemen who, from the frequent mention of their names, seem to have been most active in the discovery of the plants enumerated in the Supplement are Dr. A. P. Garber (since deceased), Messrs. A. H. Curtiss and Charles Mohr and Dr. Gattinger. Credit is due the two first named for the discovery of the greater part of the 180 species found only in Florida.—F. L. S.

Origine des Plantes Cultivées. Par Alph. De Candolle. 8vo., pp. 377. Paris: Germer Baillière et Cie. 1883.

Michigan Agricultural College. Report of the Professor of Botany and Horticulture for 1881 *and* 1882. By Dr. W. J. Beal. 8vo, pamph., pp. 57.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College Tuesday evening, Jan. 9th, the Vice-President presiding.

The Herbarium Committee reported contributions to the herbarium from Messrs. Day and Britton.

The Librarian read the titles of the books and periodicals that had been received since the last meeting.

This being the Annual Meeting, the Treasurer presented his report for the preceding year.

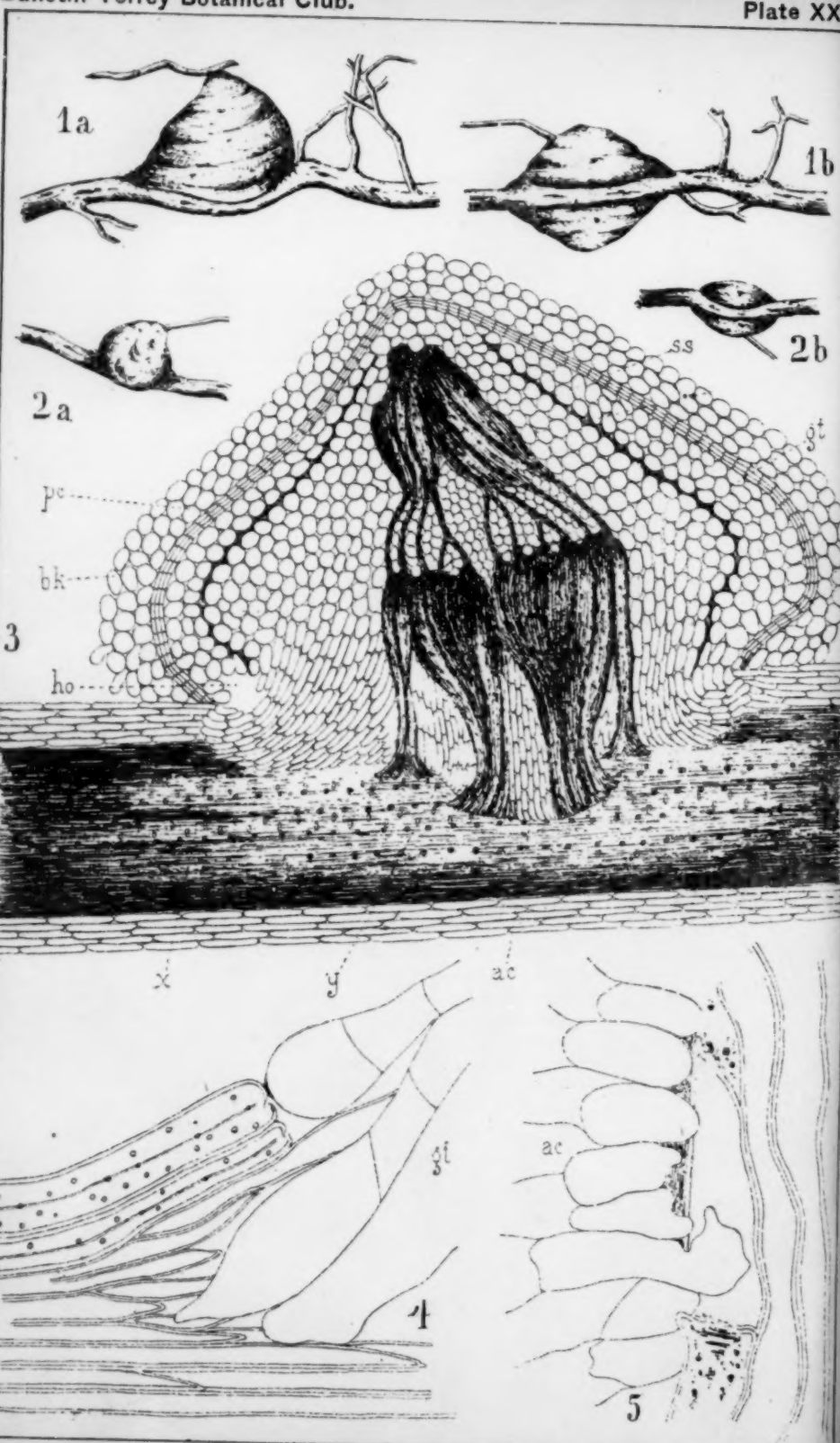
The New Jersey Flora.—Mr. Britton exhibited specimens of *Rudbeckia speciosa* and *Senecio tomentosa;* the former found in Cumberland County, N. J., by Mr. Commons, and new to the State, and the latter found by the same gentleman at Cape May, and by Mr. C. A. Gross at Landisville.

Albinism.—White-flowered forms of *Habenaria psycodes*, *Sisyrinchium Bermudiana* and *Cirsium arvense* were shown by Prof. Day.

New New York Stations.—Mr. Willis gave Mt. Kisco as a station for *Potentilla fruticosa*, a plant new to the Westchester County flora. Mr. Britton reported a locality near East Chester, on the Boston Turnpike, as a new station for *Leontodon autumnale.*

Officers.—The following officers were elected for the present year: President, J. S. Newberry; Vice-President, Addison Brown; Recording Secretary, Arthur Hollick; Corresponding Secretary, Benjamin Braman; Treasurer, W. H. Rudkin; Editor, W. R. Gerard; Associate Editor, N. L. Britton; Librarian, N. L. Britton; Curator, P. V. Le Roy.

One corresponding member was elected.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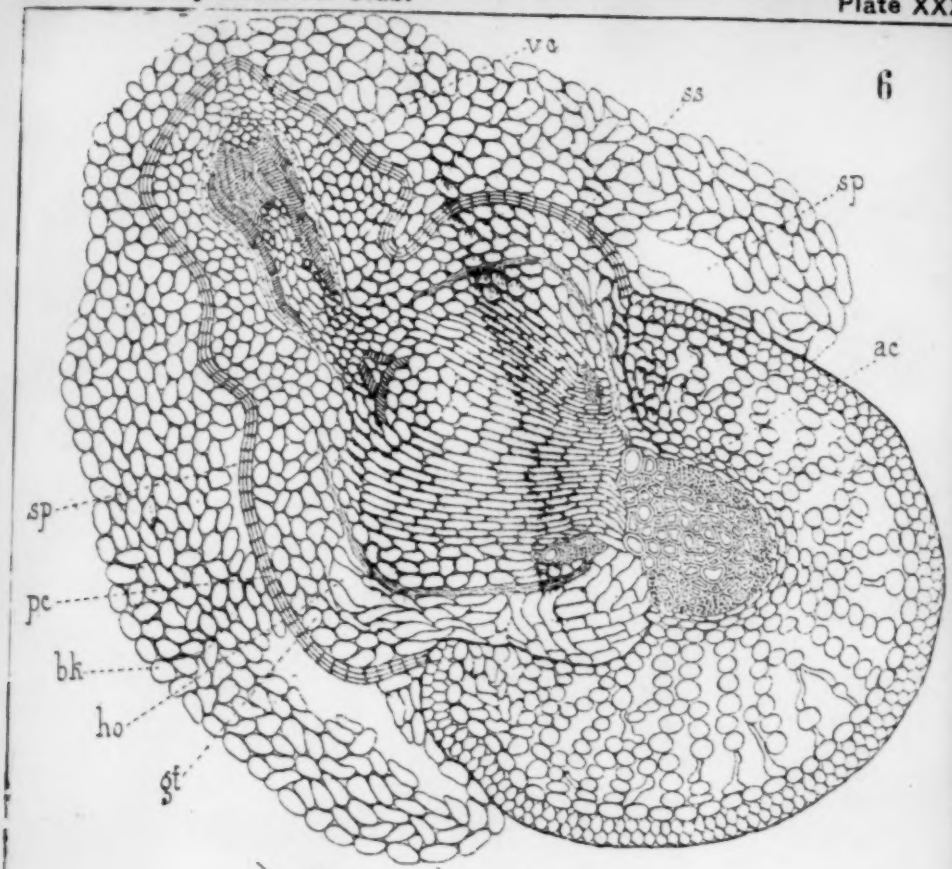

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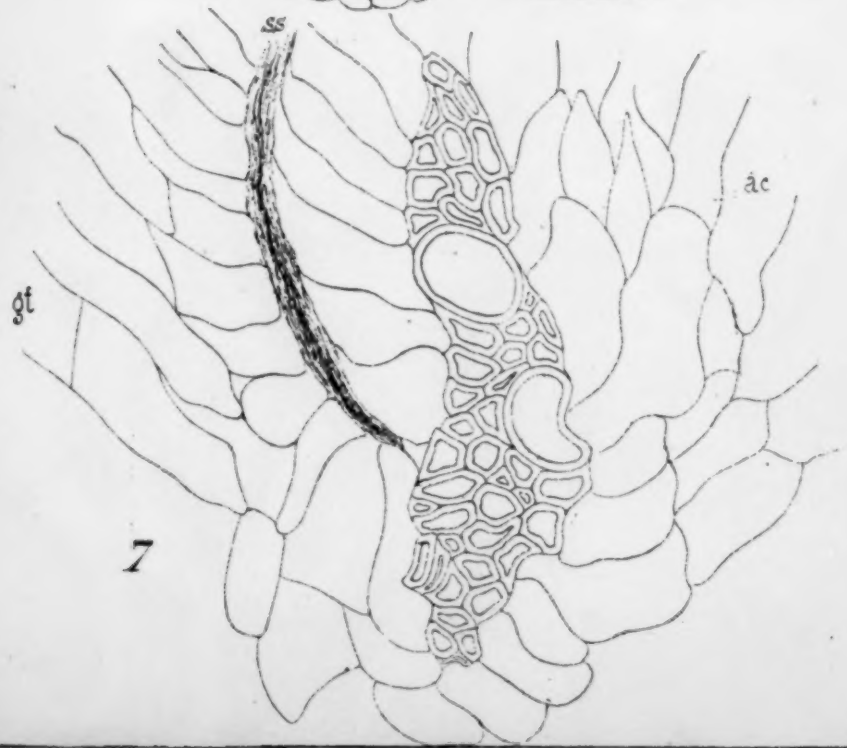

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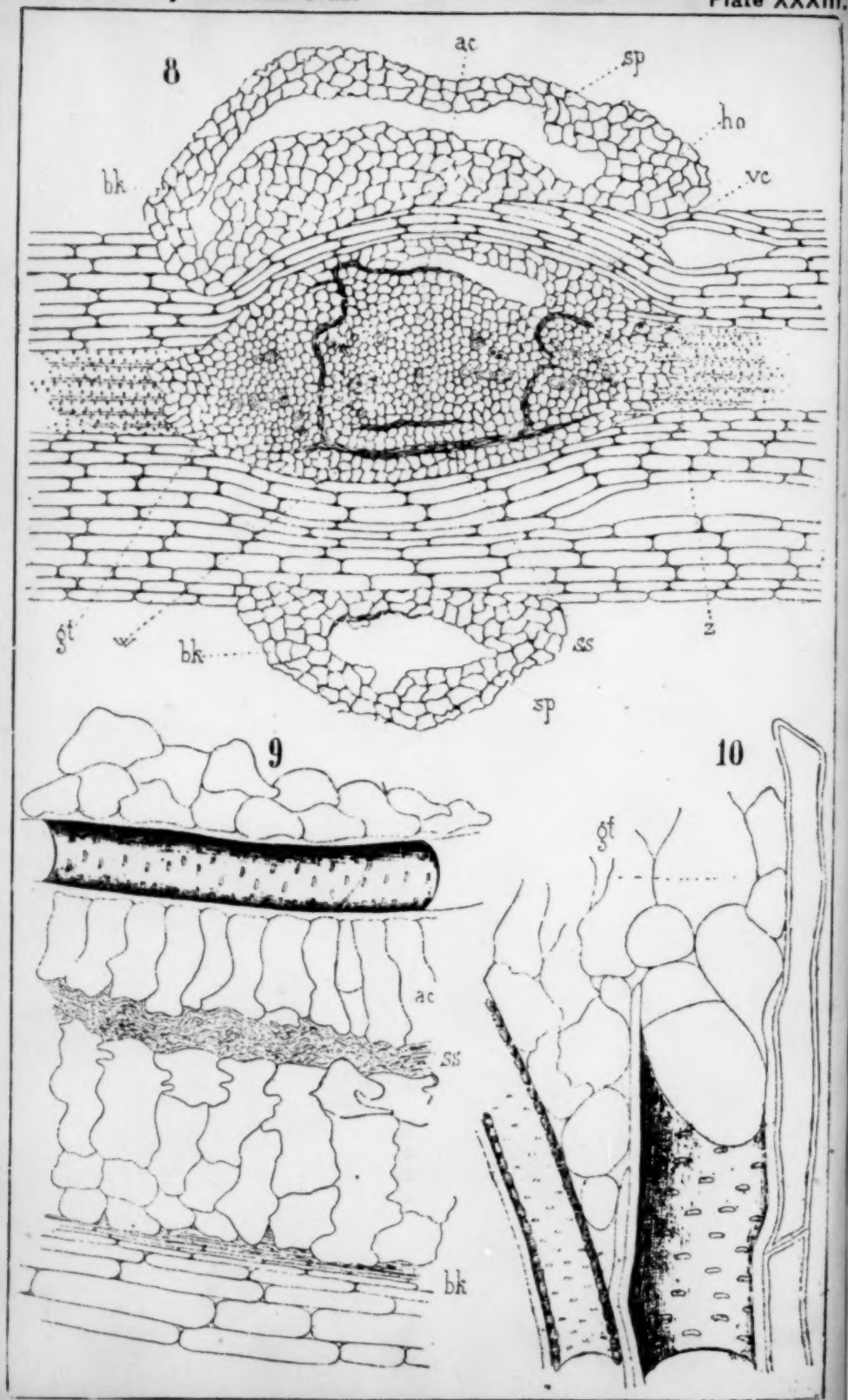
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BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, April, 1883. [No. 4.

Notes on the Haustoria of some N. A. Parasitic Phanerogams.

By Jos. Schrenk.

(Plates xxxi–xxxiii.)

Comandra umbellata, Nutt.—The following description of the haustorium of *Comandra* is based on specimens that grew on the roots of *Aster Tradescanti*, L. The figures on the accompanying plates (except Fig. 5), were all drawn from such haustoria; those from other dicotyledonous foster-plants, however, are not at all essentially different. In Figs. 3, 6 and 8 the *outlines* of the various tissues are magnified 80 times, while the individual cells are made to represent the type of those tissues by employing higher powers. In the figures of the other sections the cells appear magnified about 500 times, and the perspective illustrations of the entire haustorium with its foster-root, Figs. 1*a*, 1*b*, and 2*a*, 2*b*, 8 and 12 times respectively. For the sake of brevity, I shall, with reference to the foster-root, call the sections represented by Figs. 3, 6 and 8 respectively, the longitudinal, the transverse, and the tangential (the last being a cross-section of the haustorium itself).

The *haustoria* (suction-organs) of *Comandra* grow on thin, short branches of the root, and usually appear as if stalked. Sometimes they seem to be terminal (Fig. 2*a*), but their internal structure, as well as the common mode of their growth, illustrated by Fig. 1*a*, show that they are lateral organs. The rootlet bearing the haustorium may run parallel with the foster-root (Fig. 1*a*), or in a different direction (Fig. 2*a*). The form of the haustoria is half-ellipsoidal or bell-shaped, somewhat laterally flattened, the longer diameter of their cross-section being parallel with the axis of the foster-root. Their size varies according to age and other circumstances. The smallest are quite minute; the ones figured on the plates (a little over $1^{mm.}$ high and about $1.5^{mm.}$ wide), I found to be of a common size, but there are some that are twice as large, or even larger.

Viewed externally, the haustorium appears to grasp the root of the foster-plant as a hand, deprived of its thumb, would grasp a large cylindrical object; or, still better, as one's lips would take hold of a finger-joint to suck the blood from a wound (Figs. 1*a*, 1*b*, 2*a*, 2*b*).

In describing the structure of the haustorium, we have to distinguish the interior tissues, which penetrate into the body of the foster-root, from the external covering. The latter, which we might call the *bark* of the haustorium (*bk* in all the figures), reaches from the top of the haustorium to the bark of the foster-root, which it partly encircles, thus playing the part of the lips in the above comparison. At its lower edge, we find a number of papillose cells, reaching, or

endeavoring to reach, the surface of the foster-root (Fig. 3). This "bark" consists of large, rounded, parenchymatous cells, which are usually distorted or torn at the outer surface, and in the vicinity of certain cavities, which will be mentioned hereafter. It is often formed of two or more shell-like layers, which grow successively longer, overlap one another, and thus make the surface of the haustorium appear as in Fig. 1*a*.

Under this outer covering there is a zone of oblong, prismatic cells, that are radially arranged in several close rows (*pc* in Figs. 3 and 6). This tissue does not penetrate into the foster-plant; we do not notice it in a tangential section taken as deep as the one in Fig. 8, but in sections higher up toward the top of the haustorium it is always seen encircling the central portion. Its peculiar cambium-like structure, and the manner in which the cells outside and inside of it seem to proceed from it, induce me to consider it as a kind of meristem from which, on one side, the bark (eventually with its successive layers) may originate, while on the other it may contribute to the development of the parenchymatous outer part of the central portion.

Very often there are empty spaces, caused by the stretching and tearing of the tissues, between the zone of prismatic cells and the bark (Fig. 6, *sp*), and also between the successive layers of the bark. Besides, an empty space is usually to be found extending along the curved surface of the foster-root, where the bark is attached by a few rows of cells only (Figs. 6, *sp* and 8, *sp*).

The *central portion* of the haustorium, which lies within the two zones described, and enters the body of the foster-root, consists of several distinct kinds of cells. Most conspicuous among them by their reticulated walls, their zigzag course and peculiar arrangement, are the vascular cells (*vc* in all the figures). They arise singly (Fig. 8), or in groups (Figs. 8 and 3), either at the apex of the haustorium, closely attached to the vessels of the foster-root, often even entering them, or at some distance from them. Continuing their course in zigzag lines they meet other vessels of the same kind, and unite with them in bundles, the butt ends of which form a rather compact ring in the centre of the haustorium. From the different groups of this ring, numerous *single* ducts proceed upward and converge into a large bundle, more or less distinctly divided longitudinally into two halves, and finally join the plerome of the *Comandra* rootlet (see Fig. 3, and for the upper half, Fig. 6). It usually happens that a zone around the lower part of the vertical axis of the haustorium contains no vessels. (Figs. 6 and 8). In Fig. 6, therefore, we see no vascular cells in the lower half, except a small portion of an arc (joining two groups of vessels) which was sliced off by the knife.

In the upper part of their course the vascular bundles are enclosed by a few rows of elongated, narrow prismatic cells (see Fig. 6), which are similar to the prismatic cells inside of the bark, but are much narrower and with thinner walls. There is little doubt that they perform the functions of the cambium of stems and roots.

Another kind of elongated (but not prismatic) active cells accom-

panies and surrounds the vessels in their lower course, where, in fact, they form the bulk of the haustorium (*ac* in all the figures). The transformation of these cells into vessels by the deposition of the reticulated thickening on the cell-wall, and the subsequent union of several cells into one duct, can be plainly traced.

The space in the central portion not occupied by the tissues mentioned is filled with a ground tissue of parenchymatous cells, not unlike those of the bark in form, but, for the greater part, of smaller size (*gt* in all the figures). In the lower half, especially in close proximity to the foster-root, these cells become also narrow and elongated. But at the two lateral extremities, where they curve outward to insert themselves longitudinally between and into the cells of the foster-root, many of them assume an inflated, club-shaped form (at *x* in Fig. 3, *gt* in Figs. 4, 8 and 10).

In all the sections we notice peculiar, striate bands dividing the parenchymatous tissue into shell-like layers (*ss*). Along these bands, cavities like those between the bark and the zone of prismatic cells are frequently met with, as in Figs. 3, 6, and 8. Similar structures were called "stripes of separation" by Solms-Laubach in his excellent description of the haustorium of *Thesium*, the Old World near relative of our *Comandra*.* Solms-Laubach has shown that they consist of parenchymatous cells, crowded together and crushed by the multiplying neighboring cells into a compact mass, in which the component individual cells are recognizable only with difficulty or not at all. As these notes are to furnish merely an anatomical description, I will reserve my opinion in regard to the origin of these "stripes," and will simply state that in *Comandra* they seem to be of a more complex nature than in *Thesium;* for, in the former, we find them not only in more or less concentric zones, as in *Thesium*, but every larger group of vessels with meristem tissue appears partly surrounded by such a shell of compressed cell-membranes.

The difference in the manner in which the cells of these two parasites are attached to those of their foster-plants deserves special attention. Solms-Laubach says (*l. c.* p. 545) that the terminal cells of the haustorium are *separated* from those of the foster-plant by an irregularly developed layer of a homogeneous, yellow mass, possessing high refractive power; and (p. 547) that this mass is evidently intended to *isolate* the haustorium from its foster-root, and that wherever this mass is but poorly developed or entirely wanting, the foster-root endeavors to replace it by producing a more or less massive corky layer. In the haustorium of *Comandra* I could detect no such mass nor any corky layer. Figs. 4, 5, 7, 9 and 10 show the points of contact in sections carried out in the three principal dimensions.

Fig. 4 is a longitudinal section, showing a group of cells from the vicinity of the point *x* in Fig. 3. Three cells, *gt*, belonging to what I have called the ground-tissue of the haustorium, enter some phloëm of the *Aster* root; the walls of all the cells can be plainly distin-

* Hermann Graf zu Solms-Laubach, über den Bau und die Entwickelung parasitischer Phanerogamen, in Pringsheim's Jahrb. für wissensch. Bot., Vol. vi.

guished without any intervening substance between them. The same is the case in Fig. 5, taken from a longitudinal section of a *Comandra* haustorium on a *Vaccinium* root. The location of this group of cells corresponds to the point *y* in Fig. 3. Here one cell of the parasite, having struck a tracheïd of the *Vaccinium* at right angles, has penetrated it, and within its cavity has formed a peculiar, capitate expansion. The other *Comandra* cells are about to break throngh the wall, while the adjoining cells of the foster-plant have already been partly disintegrated.*

Fig. 7 represents a cross-section of some vessels that have been entirely separated from the plerome of the *Aster* root by the rapidly growing apex of the haustorium, which, like a wedge, exerts a downward and sidewise pressure. Some of the cells (pitted vessels) are very much indented or compressed laterally. The same group, less magnified, will be found in Fig. 6, and another similar one, on the other side of the same haustorium. In this case, too, the cells of the parasite are seen in *close contiguity* with those of the foster-root.

Fig. 10, from a point *z* in the tangential section, Fig. 8, shows some cells of the parasite, that have descended vertically, and then have curved outward, to the right (compare Fig. 3), as they meet a large pitted vessel of the *Aster* and crowd into it, their walls closely pressing against those of the vessel. Some other descending cells are breaking the connection between this cell and the neighboring one.

A similar vascular cell of the *Aster* root, from a place corresponding to the point *w* in Fig. 8, but somewhat nearer to the apex of the haustorium, is shown in Fig. 9. It has been detached from the other vessels and is now wedged in between the actively growing peripheral and central cells of the interior haustorium. This figure, at the same time, explains the structure of the "stripe of separation," *ss*. We see the cells on both sides of it, but especially toward the circumference, yielding to the expansive force of the haustorium, and we can easily imagine that some of them will soon be totally crushed, and that their membranes will help to increase the mass of the "separation stripe." We also notice, at *bk*, some layers of bark-cells. They appear very much reduced in width, the innermost exceedingly so. Using a lens of lower power we might easily take this layer of partly and totally collapsed cells for the "homogeneous, yellow mass" spoken of above, especially after treating the section with alkalies for the purpose of making it transparent.

I think what I have said in explaining the five last figures will be sufficient to show that, in *Comandra*, there exists a direct and unobstructed communication between the cells of the haustorium and those of its foster-root.

Hoboken, March, 1883.

Aspidium Lonchitis, Swz.—The range for this fine fern is now extended to California, it having been collected by Mr. Pringle at Castle Lake, Siskiyou Co., September 5, 1882.

GEO. E. DAVENPORT.

* By the shading it is simply intended to show the wall of the tracheïd perspectively.

New Plants.

By Edward Lee Greene.

Œnothera Hilgardi. — Annual, canescently puberulent, 3–6 inches high, divaricately much branched; leaves linear, spatulate, entire, 1–2 inches long, including the petiole, the lamina deflexed; branches corymbose in flower, densely spicate in fruit, the spikes leafy; petals 2½ lines long, obovate, entire; capsule ½ inch long, straight, sharply angled, attenuate from base to apex; seeds strongly clavate, pale, smooth and shining.

Collected on moist alkaline soil of the Klickitat Swale, Washington Territory, in July, 1882, by Prof. E. W. Hilgard.

It is nearly related to *Œ. andina*, Nutt., but is a larger plant, with a depressed habit of growth, much larger flowers, sharply angular capsules, and clavate seeds. The seeds of *Œ. andina* are linear-oblong, darker colored, and not so smooth.

Corethrogyne detonsa.—Suffrutescent (?), branches very leafy up to the base of the loose panicle; leaves sub-coriaceous, oblong-oblanceolate, 2–4 inches long, their whole margin coarsely serrate-toothed, densely white tomentose beneath, less so above, the uppermost linear-oblong and finely serrate; involucres large, campanulate, of numerous, rigid, densely woolly scales, in many ranks; receptacle without chaff; style-tips without bristles, but coarsely short pubescent under a lens.

The single rigid, leafy branch, apparently that of a more or less shrubby plant, is in the herbarium of the California Academy, without a note to indicate whence or through whom it was obtained. Though unmistakably a *Corethrogyne*, it lacks the main technical character of the genus, *i. e.*, the bristly style-tips; or at least the long bristly hairs of the other species are, in this, shorn down to a mere pubescence, which is not apparent to the unaided eye. The specimen has the appearance of being very old, and may have come from some island of the Californian coast long ago.

Encelia stenophylla.—Shrubby, glabrous and apparently somewhat glutinous; leaves two or three inches long, narrowly linear, entire, crowded on the branches; heads small, rather numerous, in a rather close and mostly long-peduncled corymb; involucre less than half the length of the disk, its closely imbricated scales lanceolate, with sparingly hispid-ciliate margins; akenes cuneate-obovate, densely villous throughout, each margin bearing a stout awn.

Collected many years since on the Cedros (wrongly written "Cerros") Islands, by Dr. Veatch, whose copious specimens have remained in the herbarium of the California Academy of Science, hitherto unnoticed.

Hemizonia (Hartmannia) Kelloggii.—Diffusely paniculate, 1–3 feet high, stout and somewhat hispid; cauline leaves pinnatifid, 1–3 inches long; those of the branchlets smaller and entire; heads numerous and scattered, of 5–6 ray- and only 3–4 disk-flowers; both stipe and beak of ray-akenes very prominent and strongly bent; pappus of disk-akenes mostly united at base, or even to the middle, forming a tube.

Very abundant, according to the observation of Dr. Parry and myself from the railroad cars, throughout the region of the lower San Joaquin, yet not appearing to have been collected except by Dr. Kellogg, whose labels say "Near Antioch, on dry hills, April 22d, 1870," and who referred the plant to *H. fasciculata*, the more branching states of which it well resembles; but the much larger size, and different habitat, and more especially the very prominent stipe of the ray-akenes, and the united scales of those of the disk, show it easily distinct.

ARTEMISIA (ABROTANUM) FRANSERIOIDES.—Stems two or three feet high, solitary, from a perennial root; leaves bipinnatifid, broad and very large, the lower and those of sterile offshoots often 6 to 10 inches long (including the petiole) and two-thirds as broad, the upper gradually reduced and those of the long, narrowly racemose panicle simple, lanceolate, all of very thin texture, green above and pale beneath with a very minute, appressed tomentum; heads very large, nodding; scales oblong, obtuse, with sparingly lacerate-ciliate, scarious margins, and the greenish back dotted with roundish, white glands; receptacle conical; corolla glabrous; style-tips truncate, densely panicillate.

In deep shady woods of *Pseudotsuga* near the summits of the Pinos Altos Mountains, New Mexico, flowering in the middle of September, 1880; pleasantly fragrant and rather handsome, with the aspect of certain species of *Franseria*. Dr. Gray informs me that it has been collected by Gunnison, in Colorado, and by Rothrock, in Arizona, and that it was referred to *A. discolor*.

Two New Species of Grasses.

By GEORGE VASEY.

STIPA STRICTA.—Culms 1 to 1½ feet high, erect, slender; radical leaves setaceous, more than half as long as the culm; cauline leaves 3 or 4, the lower 5 to 6 inches long, the upper short, its sheath dilated and enclosing the base of the panicle, ligule very short; panicle 4 to 8 inches long, strict, erect, the lower rays in twos or threes, above single, appressed, one an inch long, the other nearly sessile; outer glumes narrowly lanceolate, acuminate, 3-nerved, thin; flowering-glumes about 3 inches, including the stipe, pubescent all over, awn 10 to 14 inches long, twice bent, the lower half strongly pubescent, but not plumose.

Oregon, W. N. Suksdorf, and through the Sierra Nevada Mountains.

It has been mistaken for *Stipa occidentalis*, which has longer *plumose* awns, broader 5-nerved glumes, a *conspicuous* ligule, and a shorter, looser panicle. It differs from small forms of *Stipa viridula* in the shorter, more slender culms, shorter rays of the panicle, narrower glumes and shorter awns.

ARISTIDA PALMERI.—Culms erect, slender, 1½ to 2 feet high, smooth, simple or branched at the base; radical leaves very short, setaceous; cauline leaves 4 or 5, somewhat equidistant, 2 to 4 inches long, ligule a ring of short ciliate hairs; panicle 6–10 inches long,

erect, the branches mostly in pairs, 2 to 3 inches long, becoming divergent, below sheathed in the upper leaf, sparingly flower-bearing above the middle, branches and pedicle slightly scabrous; spikelets, including the awns, 9–10 inches long; glumes 4 to 5 lines long, nearly equal, narrow, 1-nerved, acuminate, slightly scabrous on the keel, rather shorter than the flowering-glume, which is 5 to 6 lines long, including the short pubescent stipe, narrow, smooth, the awns nearly equal, 5 to 6 lines long, erect.

Collected in Southern Arizona in 1869 by Dr. E. Palmer.*

A New Ramalina.

By EDWARD TUCKERMAN.

RAMALINA CRINITA, *sp. nov.*—Thallus cæspitose, rigid, compressed, sub-dichotomous, linear-laciniate, at length much dilated, greenish-glaucous, the divisions smooth, interruptedly white-striate, and becoming lacunose, attenuate at the summits, and clothed at the margins more or less thickly with strong, solitary or clustered, finally branched, black fibrils; apothecia middling-sized to large (3–10$^{mm.}$ in width), subterminal and lateral, subpodicellate, varying as to smoothness as the thallus, the margins blackened; spores oblong-ellipsoid, $\frac{15-20}{6}$ mic.

On low shrubs of *Euphorbia misera*, in company with *Roccella leucophæa*, *Physcia erinacea*, etc., on the coast, San Diego, California, C. R. Orcutt, in herb. Sprague; found also by the same collector, at Todos los Santos, Lower California; spermogones not observed. In the only other known species comparable with this, inasmuch as the slender divisions pass above into, and are beset with black fibrils (*R. melanothrix*, Laur., known only from the Cape of Good Hope, Drège!) the spermogones are described as black. The tufts of our plant vary from one and a half to three inches in height in the specimens seen as yet, and the width of the divisions from 2$^{mm.}$ to more than an inch. The general aspect of the lichen suggests the stock of *R. calicaris*.

Notes on the Adirondacks.—The recent action of the Legislature having brought the great North Wilderness into prominent notice, some general notes made on a recent hurried journey through a portion of that region may not be devoid of interest. Commencing at North Creek, some sixty miles by rail from Saratoga, a stage journey of twenty miles, followed by a buck-board progression—one could hardly call it a journey—of ten miles further through a wooded and broken country, brings us to Blue Mountain Lake. This sheet of water, with its irregular and deeply indented shores and numerous islands, is perhaps the most picturesque of the almost numberless lakes which constitute so prominent a feature of the whole region. The vegetation of

* I have a letter from Mr. Suksdorf, of Washington Territory, in which it is stated that Mr. Howell is entitled to the credit of the discovery of *Agrostis humilis* (described in the February number of the BULLETIN), although he (Mr. S.) also collected on the same mountain—*Paddo* being the Indian name for Mt. Adams.—G. V.

the locality is varied, apparently representing a large number of species common to the Northern and Eastern States; but its whole aspect indicates a severe climate and sterile soil. A notable feature at the time of our visist, August 15th, was the wonderful size and abundance of the fruit of many species. Everywhere on lower ground was *Cornus Canadensis*, with bunches of bright red berries, making the ground in places fairly brilliant. Many of the plants were also in bloom, but the depauperate appearance of the flowers showed them to be plainly out of season. *Clintonia borealis*, though less abundant, was even more striking. Here and there it occupied the ground in patches, to the exclusion of nearly all other plants, while every scape bore several, often a half dozen, berries usually a half inch or more in diameter. The color was of the intensest cobalt-blue, which to my knowledge is not anywhere equalled in fruit or flower. Other species also remarkably conspicuous for their fruitfulness were *Streptopus roseus*, *Medeola Virginica* and *Trillium erythrocarpum*. A number of species, which, further South are found only in swamps, were seen flourishing here on steep and comparatively dry hill-sides. Among undershrubs, *Viburnum lantanoides* was very abundant, and, on lower ground was everywhere laden with great broad cymes of beautiful coral fruits. Far up the mountain-side the plants were still abundant, but bore no fruit.

The ascent of Blue Mountain, instructive in the opportunity it affords for the study of mountain vegetation, offers a perhaps still greater reward in the way of magnificent scenery. The mountain is about 4,000 feet in height, and stands comparatively isolated in a vast amphitheatre of hills and low mountains. A forest stretches in every direction, apparently unbroken except by the lakes and ponds of various sizes, of which about twenty are in sight. In general aspect the forests appear to be made up largely of conifers, but a closer inspection shows that such is not the case. Indeed, nowhere in the Adirondack region did I encounter any exclusively coniferous forests, or any where the conifers were not equalled in number by broad-leaved species. The grand feature of the view from the summit of Blue Mountain, however, is the group of mountains of which Mt. Marcy is the centre, lying some thirty miles to the east. Few mountain views, I apprehend, are grander than this.

On the few acres of cleared land in the vicinity of Blue Mountain Lake it was interesting to note the promptness with which nature sets about clothing the open spaces with vegetation. Left to itself for a single year, a clearing, especially if it has been burned over, yields a luxuriant crop of the two fire-weeds, *Epilobium angustifolium* and *Erechthites hieracifolia*, the former largely in excess. In clearings two or three years old, as also along the sides of roads, *Prunus Pennsylvanica* begins to appear in great abundance. Many of the plants were fairly vigorous, while a large number was seriously affected by the black-knot. So far as these clearings are intended to give space for cultivated fields, they appear altogether unpromising, judging by the few efforts at gardening here and there visible. Whatever else may be in store for the wilderness as a whole, it is safe to

predict that no considerable areas will ever be devoted to agricultural purposes.

A canoe journey through Blue Mountain, Raquette and Long Lakes and connecting streams and ponds, is an event of rare interest. The vegetation of the shores is everywhere sufficiently attractive, but one's interest and admiration culminate at various points along Raquette River. Nowhere have I ever seen more beautiful natural planting. Very often the commingling of the vegetation is such as to produce the most striking effects, which linger long afterwards as pleasant pictures in the memory. At certain especially noteworthy spots the principal species on the river banks appeared to be *Acer dasycarpum*, *Pyrus Americana*, *Abies balsamea* and *Lobelia cardinalis*. The maples, of rather small size and bushy form, were in greatest numbers. Mingled with these were shrubby forms of mountain ash with branches appearing like fronds, and producing an airy and graceful effect; and the back-ground was filled in with rather sombre but beautiful specimens of balsams, while in front of all and close to the water's edge were great masses of luxuriant cardinal flowers laden with a profusion of bloom.

Of the numerous aquatic species encountered, none was more attractive than the water-lilies. The patches met with here and there presented marked differences in the size and color of the flowers, the size and general appearance of the leaf, and in the whole aspect of the plant. The forms in the Raquette system of lakes and streams answered best to the descriptions of *Nymphæa odorata*, while after crossing the divide at Stony Creek and entering the Saranac system all the plants observed answered more nearly to *N. tuberosa*. The whole appearance of the Nymphæas was such as to suggest the need of a modification of the description of the species as now given, and perhaps the recognition of several well marked varieties.

The wise action of the Legislature in refusing to sell any more of the nine hundred square miles still owned by the State in the Adirondacks ought to be supplemented by the purchase of perhaps an equal area, or at least by the passage of a law securing its control, so that the further removal of timber may be prohibited, or at all events properly regulated. Perhaps the greatest damage to the natural beauty of the region has thus far resulted from the damming up of streams and the outlets of lakes. The object is sometimes to facilitate the getting out of timber, at others to deepen the water so as to permit the use of small passenger steamers, which are unhappily becoming quite numerous. In either case the result is the permanent flooding of the banks and the death of all timber on the flooded areas. Even some parts of the beautiful Raquette have been already doomed. The devastation from this source ought also to receive legislative attention, and be as far as possible prohibited. In general, it seems to me that the vast importance of the Adirondack forests to the State, and the irreparable injury, even from the utilitarian standpoint alone, which their destruction would bring, has never been overstated, or even fully stated.

Cornell University, Ithaca. A. N. Prentiss.

Notes from Central New York.—*Equisetum littorale*, Kühlewein, discovered by Mr. Pringle on the shores of Lake Champlain, Vt., grows very abundantly at the foot of the high shady banks of the Oswego river, just this side of the Oswego Water Works Company's pump-house. The locality, being saturated continually from the Company's reservoir above, is entirely covered with the light green, branched stems of this long, tender *Equisetum*. I found good specimens in fruit as late as the middle of October. I have no doubt that the plant grows farther up the river, above Minetto, where the low shores are covered with *Hydrocotyle umbellata*, L., and where I found, between the island and the canal, a beautiful specimen of *Lythrum alatum*, Pursh.

Since the only locality for *Eleocharis quadrangulata*, R. Br., at the outlet of Oneida Lake, is exhausted, it will prove of interest to botanists in this State to learn of another station for it, this being six miles east of this city, at Paddy's Lake, near South Scriba P. O. On the eastern shores of this lake, where the water is shallow, this rare rush fills the water and forms a safeguard for *Bidens Beckii*, which grows in the deeper water behind it. Here I found a monstrous form of *Nymphæa tuberosa*, Paine. There were 3–4 perfect flowers, each with green sepals and white petals, upon one stem and within the usual flower, on different plants.

Potentilla recta, L., dropped from the later editions of Gray's Manual, is perfectly naturalized east of the city, along roadsides and in pastures, along with *Hieracium aurantiacum*, L. I have found specimens of both these plants even as far as four miles out in the country.

Coreopsis discoidea, T. & G., abounds on the borders of a pond on Lake Ontario, three miles north-east of the city, where are also found *Cakile Americana*, *Euphorbia polygonifolia*, *Lathyrus maritimus*, *L. palustris*, *Artemisia Canadensis* and *Sporobolus cryptandrus*.

Scirpus lacustris, L., var. *occidentalis*, Watson, grows on the sandy shore of Lake Ontario, west of Twelve-mile Bluff, on the border of a small pond.

To the many rare plants found in Lodi Swamp, Syracuse, N. Y., I may add: *Solidago linoides*, Solander, *S. neglecta*, Torr. and Gray, *S. Ohioensis*, Riddell, *Viola renifolia*, Gray, *Valeriana sylvatica*, Richards, *Tofieldia glutinosa*, Willd., *Arethusa bulbosa*, L., and *Mitella nuda*, L. I think this is the most interesting small swamp, for botanists, in Central New York, but, alas! the new West Shore Railroad and the growth of the near city will soon destroy this little botanical paradise.

The much talked of "Cicero Swamp," some six or seven miles north-east of Syracuse, was visited by me in July last. This dismal forest, visited only by berry-pickers in the fall, and lumbermen in winter, does not pay for the trouble and danger that it requires to obtain access to it. Such plants as grow there (*Woodwardia Virginica*, orchids, *Dalibarda*, etc.) can be found easier in more accessible localities, and far from the numerous rattlesnakes of that green desert, from out of which even an expert guide succeeded in finding his way only by listening for the sound of a locomotive whistle on the

Central Railroad. Great Latin orator, what a disgrace to your immortal name!

Oswego, N. Y. J. H. WIBBE.

Notes on the Coniferæ of Washington Territory.—The following observations are limited to the eastern slope of the Cascade Mountains, between the parallels of 46° 30′ and 47° 30′ north latitude. It is difficult to give any fixed altitudes for the range of a species, as this is in a great measure regulated by the amount of moisture, these two factors of altitude and moisture combined determining the composition of the forests in the different localities. The damp winds from Puget Sound, after passing over the crest of the mountains, are gradually deprived of their moisture until, at a distance varying from thirty to forty miles from the summit, the soil becomes too dry to support a growth of timber. This line between the forest and sage-brush areas varies in altitude from 1,500 feet, along river valleys, to 3,000 feet. The lowest and perhaps the most extensive, at least the most valuable forests, consist of an open growth of yellow pine (*Pinus ponderosa*, Dougl.) and Douglas spruce or yellow fir (*Pseudotsuga Douglasii*, Carr.), the former extending to an altitude of 4,500 feet, and in dry situations even to 5,000 feet, while the latter ranges somewhat higher. The yellow pine is never found in the denser and damper forests towards the summit, even at as low an elevation as 3,000 feet. The whole timbered area can be well divided into the lower and dry or yellow pine forest, and the upper and damp or fir (*Abies*) forest. The term upper in this sense means proximity to the summit rather than altitude. Probably nine-tenths of the upper area are composed of fir—*Abies grandis*, Lindl., (white fir) first appearing, then becoming mixed with *Abies amabilis*, and finally the first species disappearing and the latter forming the bulk of the forest area at the summit. Another species of fir probably occurs here, *Abies concolor*, Lindl., or perhaps *A. subalpina*, Engelm., but its distribution was not well determined. A few trees of *Abies nobilis*, Lindl., (red fir) were seen near Natches Pass at an elevation of 6,000 feet. *Pinus contorta*, Dougl., var. *Murrayana*, (black pine, tamarac) grows throughout the upper yellow pine area. In this situation it often forms dense thickets, the trees being small and with trunks as straight as arrows. The black pine is also often seen on high exposed summits with *Pinus albicaulis*, the latter ranging higher than any other of the coniferæ of the region, except perhaps *Juniperus communis*, L., var. *alpina*, (juniper) which carpets the alpine peaks. The white pine (*Pinus monticola*, Dougl.) is found scattered throughout the upper yellow pine and lower fir forests, and the beautiful light green foliage of the larch (*Larix occidentalis*, Nutt.) is often a conspicuous object at low elevations. *Picea Engelmanni*, Engelm., (spruce) is often a companion of the fir at high elevations, but is rather local in its distribution. The two hemlocks of the region, *Tsuga Pattoniana* and *Tsuga Mertensiana*, Carr., the latter much resembling the eastern species, *T. Canadensis*, Carr., grow through the upper fir forests. The cylindrical, oblong cones of the former are, after falling, very conspicuous by their reflexed scales. The yellow or Sitka cedar (*Chamæcyparis Nutkaensis*, Spach.) is a middle-sized

tree along streams and on lake shores, but on high exposed summits at over 6,500 feet it is hardly more than a shrub, and forms dense thickets. The arbor vitæ, the red cedar of Oregon (*Thuya gigantea*, Nutt.) is the largest tree of the region, some specimens being over ten feet in diameter. The yew (*Taxus brevifolia*, Nutt.) is frequently seen in the dense damp forests, but rarely exceeds a height of 25 feet. Some few specimens of *Juniperus Virginiana*, L., (red cedar) were seen at low elevations. The main summit of the Cascade Range, in the region where the above observations were taken, has an altitude varying from 6,000 to 6,800 feet, and is generally bare of timber. Its immediate slopes are covered with grass and flowers of every hue interspersed with bunches of willows and groves of fir.

Newport, R. I. FRANK TWEEDY.

Fasciation in Rubus.—A curious case of fasciation was brought to my notice a short time since. The specimen was a cane of the cultivated black-cap raspberry, which, at the extremity, had become strongly flattened and coiled upon itself in the form of a flat spiral. The width of the cane was seven-eighths of an inch, and the thickness about one-third of an inch near the outer circumference of the coil, while on the inner side it was much thinner. The four complete coils were from one and one-half to three and one-half inches across. From the beginning of the first coil the cane bore an unusual number of abortive foliar organs, which increased in number toward the extremity until the entire tip was of a thickened and foliaceous character.

A cross-section of the cane showed it to consist of two regions of entirely different tissue. The thickened portion which followed the periphery of the curve was of normal woody structure, while the opposite side was composed almost entirely of parenchyma. This differentiation of tissues, with their unequal rates of growth, doubtless explains the phenomenon of curving. The coil became more distinct and its radius shorter as the difference between the two regions became more marked, until, at the extremity, the parenchyma predominated and expanded into a sort of flattened membrane. At the time of collection the woody region was still fresh and active, but the parenchyma was dead and withered. This, no doubt, assisted in the curvature, since several transverse fissures across the parenchyma showed that it had been subjected to considerable tension.

I believe the cultivated species of *Rubus* are especially liable to oddities of growth, but I have never seen so striking a departure as this before.

Houghton Farm, Mountainville, N. Y. W. E. STONE.

Genus Labels.—Mr. H. N. Patterson, of Oquawka, Ill., desires us to state that the first box of his North American genus-labels, from Ranunculaceæ to Compositæ, 650 genera (3 of each), is now ready for delivery. Price $1.30.

Note.—We send out with this number three plates, which are to be substituted for the badly printed ones that accompanied our March issue.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, May, 1883. [No. 5.

New North American Fungi.

By G. WINTER.

PLEONECTRIA DENIGRATA, Winter, *nov. spec.*—Perithecia cæspitulos, densissimos, errumpente-superficiales, pulvinato subhemisphæricos, usque $5^{mm.}$ diam., metientes formantia, stromatis pulvinati, intus rufescenti-lutei superficie insidentia, fere globosa, extus grisea, eleganter nigro-papillata, demum vertice depressa et umbilicata, nigrescentia, 360–470μ diam. Asci cylindracei, breviter pedicellati, 8-spori, ca. 70μ longi, 8–10μ crassi, (in aqua demum usque 110μ elongati). Sporæ plerumque monostichæ, valde difformes, rotundato-angulatæ, 3-5- plo transverse septatæ et muriformes, ad septis plus minus constrictæ, pallidissime flavidulæ, 10–16μ longæ, 7–10μ crassæ. Paraphyses filiformes, longissimæ.

In ramis corticatis *Gleditschiæ triacanthi* prope Lexington, Ky., June, 1882 ; legit W. A. Kellermann. (No. 9.)

CALLORIA RUBRO-COCCINEA, Rehm et Wint., *nov. spec.*—Apothecia sparsa vel gregaria, sessilia, patellariformis, rubro-coccinea, sicca urceolata varioque modo plicata, humida explanata, 1–$3^{mm.}$ diam. Asci clavati, apice incrassati, 8-spori, 40–45μ longi, 5μ crass. Sporæ clavatæ, hyalinæ, unicellulares, submonostichæ, 12–15μ longæ, 3μ crassæ, hyalinæ. Hymenium dilute rubro-coccineum, in lamellis tenuissimis, fere hyalinum.

In ramis *Gleditschiæ* cum antecedente.

DIAPORTHE KELLERMANNIANA, Winter, *nov. spec.*—Stroma nullum, Perithecia profunde immersa depresso-globosa, membranacea, atra, 210–260μ lata, errumpente prædita. Asci oblongo-fusoidei, 8-spori, 35–40μ longi, 5–7 crassi, sporæ oblongæ, sæpe inæquilaterales, utrinque rotundatæ vel parum acutiusculæ, medio uniseptatæ, non constrictæ, 4-guttulatæ, 9–11μ longæ, 3–3.5μ crassæ.

Ad *Zeæ Maydis* culmos putridos prope Lexington. Dr. W. A. Kellermann, cui hanc speciem dedicavi. (No. 2).

PHYLLOSTICTA PODOPHYLLI (Curtis), Winter.—(Synon. : *Ascospora Podophylli*, Curtis, in 23 Rep. of the New York State Cabinet, p. 65, sec. Cooke, *in litt.*)—Maculæ amphigenæ, angulosæ, sæpe irregulares, determinatæ, usque $12^{mm.}$ (et ultra) latæ, interdum confluentes, fuscæ, Perithecia amphigena, gregaria, plerumque secus nervos disposita, globosa, atra, ca. 100–120μ diam. Sporidia fere globosa vel ellipsoidea, unicellularia, hyalina, guttulo oleoso magno prædita, 8–9μ longa, 5–6μ crassa.

In foliis vivis *Podophylli peltati*, sæpe in consortione *Septoriæ Podophyllinæ*, Peck, in *Bot. Gaz.*, Vol iv., p. 170. Prope Lexington, Ky., leg. Dr. W. A. Kellermann. (No. 13.)

CERCOSPORA SEYMOURIANA, Winter, *nov. spec.*—(Synon. : ? *Helminthosporium olivaceum*, B. & R., in *Grevillea*, iii., p. 102.) Cæspites hypophylli, maculas indeterminatas, vel effusas et totam fere foliorum superficiem obducentes, fuligineas formantes. Hyphæ fasciculatæ, breves, 40–55 μ longæ, torulosæ, parce septatæ, simplices, brunneæ. Sporæ obclavato-filiformes, sursum plerumque longissime attenuatæ, multum denseque septatæ, amœne brunneæ, interdum ad septa constrictæ, usque 100 μ longæ, inferne 7 μ crassæ.

In foliis vivis *Gleditschiæ triacanthi*; Fulton Co., Ill.; leg. A. B. Seymour. (No. 1,780.)

Hottingen bei Zurich, Switzerland.

Cucurbita Californica, Torr.

By C. C. PARRY.

In the BULLETIN for March, 1882, the writer presented a notice of certain diagnostic characters, heretofore overlooked, derived from an examination of mature fruit of three of the peculiar perennial species of *Cucurbita* indigenous to Western North America, with outline sketches of the same. The fourth remaining species, *Cucurbita Californica*, Torr., then imperfectly known, has been lately brought to my notice by Mr. S. B. Parish, of San Bernardino, and, from very complete material kindly furnished by this enterprising collector, I am now able to complete the account, including all the recognized species of Western North America, viz.:

Cucurbita Californica, Torr.—Fruit orbicular-pyriform, 3–3¼ inches in diameter, 2¾–3¼ inches in length, on peduncles 2½ inches long; peduncles curved, thickening upwards, and marked by about ten prominent ridges, which are prolonged in longitudinal lines to the apex of the fruit, other intermediate, less prominent lines intervening on the light green, rugose-hispid surface, irregularly spotted with dark green blotches; external rind thin and flexible, becoming lobulated and deeply wrinkled when dry, and losing its orbicular shape.

Internal cellular tissue fleshy (not fibrous); placentæ in 5 pairs, shortly curved, and bearing medium-sized, light brown seed on the outer edge.

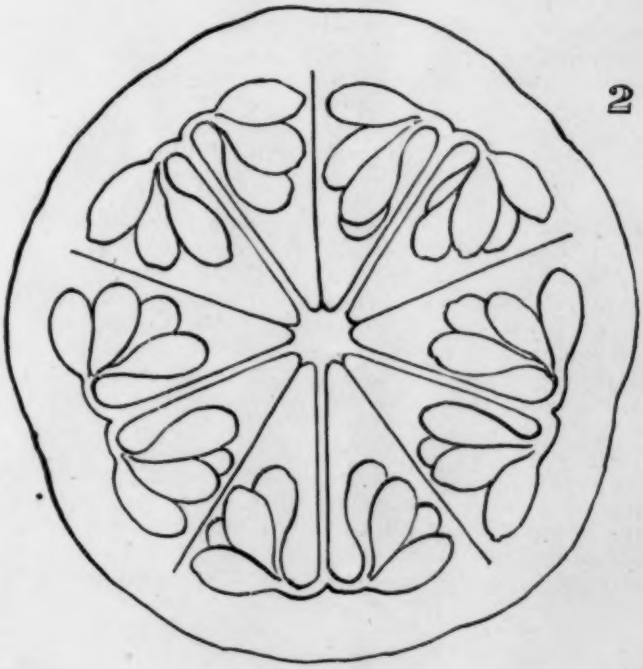
Plant with thick, fleshy, perennial root, annual branches 3–5 feet long, spreading, hispid-scabrous; leaves quinate-lobed, margins more or less undulate, dull green, mottled, with conspicuous branching veins, petioles 1–2½ inches long, blade about the same length, tendrils divided to the base; flowers 2 inches long, similar to those of the other species.

Habitat.—Collected by S. B. Parish, August, 1882, on the foothill slopes of Red-lands adjoining San Bernardino. Readily distinguished from *C. palmata*, growing in the same district, by its smaller size, diminutive foliage, and especially by its dull green, thin-rinded fruit becoming lobulated when dry.

It agrees with the description of *Cucurbita Californica*, Torr., in Botany of California, Vol. i., p. 240, from "imperfect specimens."

DESCRIPTION OF THE FIGURES.—Fig. 1. Medium-sized leaf. Fig. 2. Section of mature fruit. Both natural size.

1



2

New Species of Grasses.

By George Vasey.

Sporobolus Wolfii.—This was published and figured in the Botany of Wheeler's Survey, Vol. vi., 1878, as *Vilfa minima*. As *Vilfa* is now united with *Sporobolus*, and as the specific name is preoccupied, it therefore becomes necessary for our plant to have a new name, as above, in honor of the discoverer, Mr. John Wolf. It was collected at Twin Lakes, Colorado, in 1873. It is much more diminutive than *Sporobolus gracillimus*, Thurb., with the spikelets only half as large.

Danthonia intermedia.—Culms 1–1½ ft. high, leafy below, radical leaves 6–10 inches long, narrow, cauline leaves 2 to 6 inches, pubescent, especially on the sheaths, ligule merely a narrow hairy ring, with longer hairs at the margins; panicle narrow, 1–2½ inches long, rays alternate, mostly short, the lower generally with 2 or 3 spikelets, the upper with single spikelets; spikelets 6–8 lines long, about 5-flowered, empty glumes somewhat longer than the flowers, about 5-nerved, acute; flowering-glumes 3–4 lines long, mostly smooth on the back, hairy on the margins, nerves not prominent, teeth about 1 line long, broad, awn stout, about 3 lines long, palet slightly shorter than the flowering glume.

This may be readily distinguished from *D. sericea*, with which it has been confounded, by its shorter and smoother culms and leaves, closer and fewer flowered panicle, flowering-glume smooth or smoothish on the back, by the much shorter and broader teeth, and shorter, stouter awns.

California, Rocky Mountains, Plains of Br. America to Mt. Albert, Lower Canada (O. D. Allen).

New North American Fungi.

By J. B. Ellis.

The species of fungi here described were collected by Mr. S. J. Harkness in Utah Territory, mostly at an elevation of 7,600 to 8,000 ft. It should also be stated that the species described on pp. 123–4, Vol. viii. of this journal, were collected at this same altitude.

Alternaria hispidula.—Forming olivaceous tufts shaped like a *Helotium*, with a thick stem composed of closely compacted, branching, minutely roughened threads, expanding at intervals of 15–20μ into oval-elliptical, 3–4-septate, minutely roughened spores, 12–20 x 8–12μ.

On sage-brush.

Peziza oleosa.—Scattered or gregarious, small, subglobose when fresh, orbicular and concave, with a thick, obtuse margin when dry, substance oily-gelatinous, color bright orange-red; asci sessile, sublanceolate, broadest in the middle (75–90 x 10–12μ); paraphyses none; sporidia biseriate, fusiform-navicular, uniseptate, hyaline, 18–22 x 3–3½μ.

Allied to *P. fusarioides*, Berk. On dead herbaceous stems.

Lophiostoma pallidum.—Perithecia subhemispherical, 25$^{mm.}$ in

diameter, collapsing above; ostiolum only slightly prominent and not strongly compressed; asci sessile, subcylindrical, 90–100 x 12–15μ; paraphyses filiform; sporidia more or less biseriate, oblong-cylindrical, nearly hyaline, about 7-septate, ends obtuse, slightly curved and one end broader, 18–24 x 5–6½μ.

On weather-beaten wood of service-tree.

SPHÆRIA (MELANOMMA) SULCATA.--Superficial, densely gregarious, perithecia ovate (.33$^{mm.}$), black, not polished; ostiolum tuberculiform, large, with a rather large and nearly circular opening; asci clavate-cylindrical, 130 x 22μ; paraphyses abundant; sporidia biseriate, broad navicular-fusiform, septate, straw-yellow, becoming brown, 35–45 x 11–15μ.

On dead sage-brush.

CUCURBITARIA UMBILICATA.—Scattered, depressed-hemispheric, black, rough (.33–.5$^{mm.}$), collapsing above when dry; asci cylindrical, 114 x 11μ; sporidia mostly uniseriate, elliptical, constricted in the middle, 3-septate and straw-colored at first, becoming muriform and brown, 22–28 x 9½–13μ.

On decorticated sage-brush.

LEPTOSPHÆRIA OLIVACEA.—Perithecia submembranaceous, about .25$^{mm.}$ in diameter, buried in the substance of the stem and covered by the cuticle, which is slightly elevated, stained olive-brown and pierced by the broad, rough, obtuse ostiolum; asci clavate, 75–85 x 15–18μ; sporidia fasciculate yellow-brown, vermiform, 6–7-septate, and, when mature, slightly constricted at the septa, third joint from the tip slightly swollen, 75 x 3½–4μ.

The spore is generally slightly bent just below the last-named joint.

On dead herbaceous stems.

PLEOSPORA AUREA.—Perithecia gregarious, subcuticular (.25–.33$^{mm.}$ in diameter), soon collapsing, of coarse cellular structure and surrounded at the base with a coarse, fringe-like mycelium of brown, septate, sparingly branched, creeping hyphæ, which are plainly visible through the transparent cuticle; asci broad, obtuse, sessile, about 114 x 3μ (spore-bearing part); sporidia biseriate, elliptical, flattened, 4-septate, with all but the terminal cells divided by a longitudinal septum, golden-yellow, 27–30 x 11–15μ.

On dead herbaceous stems.

PLEOSPORA PLANISPORA.—Perithecia gregarious, collapsing when dry (.25–.33$^{mm.}$), covered by the scarcely discolored epidermis; asci 114–120 x 25–28μ; sporidia biseriate, oblong-elliptical, flattened, 5-septate, with a longitudinal septum on each side running through all but the terminal cells, yellow, becoming brown, 30–40 x 15–20 x 11μ; paraphyses abundant.

On dead culms of some grass, apparently a species of *Elymus*; mostly on the sheaths.

This is closely allied to the preceding species, but the mycelium is less abundant, the sporidia larger and quite constantly 5-septate.

PLEOSPORA BACCATA.—Perithecia subcuticular, hemispheric, collapsing, rough (.33–.5$^{mm.}$), fringed around the base with abundant, brown, creeping hyphæ; ostiolum papilliform; asci oblong-cylindrical, 114 x 23μ; sporidia biseriate, oblong-elliptical, 3-septate, with a

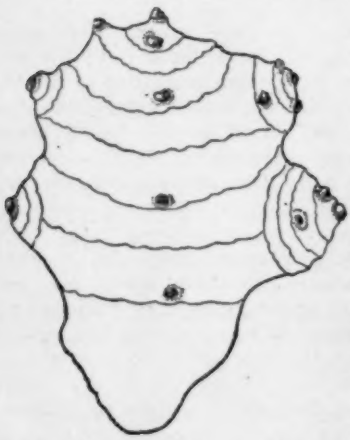
partial longitudinal septum. The spore is often composed of only six divisions or cells, loosely attached to each other, the four middle ones placed in a subquadrate manner, with a single nearly globose cell at each end. These different cells are so slightly attached to each other that they easily separate and the sporidium breaks up like a crumbling raspberry.

On the dead stems of some species of *Cirsium*.

SPHÆRIA (ANTHOSTOMELLA) PHOLIDIGENA.—Perithecia subcuticular, erumpent, hemispheric, rough (.33–.5$^{mm.}$); ostiolum slightly prominent, with a rather large aperture; asci linear, 114 x 7μ; paraphyses abundant; sporidia uniseriate, narrow, elliptical, continuously brown, 7–10 x 5–6μ. Some of the perithecia contain stylospores, which are much like the ascospores, but a little shorter. This differs from *Amphisphæria conorum*, Fckl., only in its smaller sporidia and differently shaped stylospores, and may, perhaps, be more properly considered as a mere variety of that species.

On cones of red pine. On the back of the scales and mostly covered by the overlapping point of the next scale below.

Morphology in the Tuber of Jerusalem Artichoke.—Picking up, in my garden, a tuber of Jerusalem artichoke which had been thrown out on the surface by recent spading, I was attracted by the prominence of the buds, and the distinct markings on the tuber, showing the position of the buds, leaves and branches in the order of their phyllotaxis. The accompanying sketch, which I made at the time, will exhibit this arrangement.



On the growing stem, the artichoke (*Helianthus tuberosus*) has the leaves opposite during the early part of its growth, the upper leaves gradually becoming alternate. In this tuber, or underground stem, the opposite-leaved arrangement is plainly visible. On the right side are two arrested branches from the axils of suppressed leaves, corresponding to two others on the left side which are not so fully developed. The alternate buds, occupying the front face (and to which there are others corresponding on the opposite face) seem not to have developed into branches, but remain only as buds. The wavy lines of exfoliating membrane or skin seem morphologically to belong to the leaf-system, and mark the division of the nodes, corresponding in this with the ridge formed by the expansion and adnation of the bases of the opposite leaves as seen in the stem above ground. The internodal spaces are very much contracted, and their wavy, undulating course is due to

NOTE.—*Valsa didymospora*, described on p. 98, Vol. ix., of the BULLETIN, proves to be only an imperfectly developed state of *Valsa subcuticularis*, C. & E.

the irregular cell-growth in the different portions of the tuber. I have not been able to trace the leaf-arrangement from positions of the buds, either in the Irish or sweet potato (both underground stems) so well marked, as in this of the artichoke, probably due to greater irregularity in cell-growth of these tubers. This of the artichoke offers a fine illustration of the underground tuber following the character of the growth above ground.

Aiken, S. C. H. W. RAVENEL.

Notes on New England Marine Algæ. II.—*Calothrix parasitica*, Thuret.—This species, previously reported at Wood's Hall, Mass., was very abundant last September at Cottage City, completely covering the *Nemalion multifidum* growing at low water-mark between the Oak Bluffs and the Camp Meeting landings. The natural color of the *Nemalion* was entirely lost, giving place to a very dark bronze-green, turning almost black in drying. This species also occurs at Marblehead, but quite sparingly; the plants are so scattered through the *Nemalion* as to be observable only under the microscope, not with the naked eye. I have also found what appears to be the same species growing on plants of *Batrachospermum vagum*, collected in fresh water at Billerica, Mass., by Mr. Edwin Faxon.

Codiolum longipes, Foslie.—In July, 1881, I found at Peak's Island, Portland Harbor, Maine, a form of *Codiolum*, differing considerably from the typical *C. gregarium*, A. Br., the only species recorded in America. The unicellular fronds in the Portland plant are longer and slenderer, the stipe longer in proportion to the "clava." Dr. F. R. Kjellman, of Upsala, Sweden, kindly examined a specimen, and reported it identical with *C. longipes*, a species founded on a plant recently discovered in Norway, and described and figured in Christiania Videnskabs-Selskabs Forhandlinger, 1881, No. 14. Several species of *Codiolum* have been described, but, as the development is little known, some of them may be merely stages of growth of others. My specimens appeared to be entirely in a vegetative condition, showing no indication of the formation of spores. The plant grew on boulders at about half tide, and was not mixed with any other alga. *Ulothrix isogona* grew in the vicinity, but in distinct patches, and generally not on the same rock. When wet, the two were hardly distinguishable by the naked eye, but, when dry, the *Codiolum* showed a curious mottled appearance, the tufts falling apart so that the transparent stipes showed in minute white dots among the green of the upper parts of the cells.

Chorda tomentosa, Aresch.—Though not recorded, this species has probably been collected in this country, but confounded with *C. filum*, the spring state of which it considerably resembles. It is, however, shorter and stouter, and has longer and denser hairs, which continue till after the fruit is formed, in May and June. The hairs of *C. filum* fall off in the spring, while the fruit is not formed until August. The sporangia of *C. tomentosa* are about double the length of those of *C. filum*, and are cylindrical rather than ovate. The former are figured in Areschoug's Observationes Phycologicæ, Part iii., Tab. ii., Fig. 1; the latter in Farlow's Manual of the New Eng-

land Marine Algæ, Pl. vi., Fig. 1. My specimens were collected in June, at Nahant, Mass., where the plant seems not to be very rare.

Ralfsia deusta, Ag., reported in America only from Eastport, Maine, I found at Marblehead, Mass., near the Clifton House. It grew just at and a little below low water-mark, in company with *Corallina* and *Lithothamnion*. The growing plant is rather handsome, and quite distinct from other species of the genus, but in drying it loses much of its character.

Ralfsia verrucosa, Aresch., I found at East Chop, Martha's Vineyard, last September; and also

Petrocelis cruenta, Ag. Neither species has been reported as found south of Cape Cod. I found them after a severe gale, which had washed up large quantities of algæ. These two species were on pebbles on which *Phyllophora Brodiæi* was growing, and had apparently come from deeper water. Both were without fruit, and were smaller than the common northern forms.

Callithamnion membranaceum, Magnus.—This curious species, which is quite common in Massachusetts Bay, is much the smallest of the genus, and its habitat is a very unusual one for one of the Florideæ. It grows in the interior of polyzoa, sponges, and sometimes of siphonaceous algæ. In spring and summer, Laminarias and Agarums will not uncommonly be found covered with a *Sertularia*, which, instead of being white or yellowish, is bright red, being filled with a dense mass of *Callithamnion*. This species was discovered in 1872 in the German Ocean, by Dr. P. Magnus, and described and figured by him in Die Botanischen Ergebnisse der Nordseefahrt, Berlin, 1874. What is probably the same plant was found on the Massachusetts coast by Dr. P. F. Reinsch, and described and figured in the *Botanische Zeitung* for Jan. 10, 1879, but no name was given to it. The position of the tetraspores in Reinsch's figure differs somewhat from that in Magnus's. All the fertile specimens I have found agree with the latter, and a specimen which I sent to Dr. Magnus is pronounced by him perfectly identical with the European plant. It is reported by Hauck as found in the Adriatic, and is probably quite generally distributed, but has escaped notice from its minuteness and place of growth.

Malden, Mass. FRANK S. COLLINS.

Thalictrum anemonoides or Anemone thalictroides, which?—Dr. Gray, in his Manual, has placed the rue-anemone in the genus *Thalictrum*, and he has been generally followed in this country. Wood, however, places it, in his Botanist and Florist, in *Anemone*, and he is, I think, correct in doing so. It differs essentially from *Thalictrum* in having an involucre, and agrees in all respects with *Anemone* except that Dr. Gray makes the arbitrary distinction "achenia * * * not ribbed." Omit the *not*, and let it read "achenia pointed or tailed, flattened *or* ribbed," and the generic description of *Anemone* of Dr. Gray will fit admirably the rue-anemone. It resembles in a striking manner the *Anemone nemorosa*, and is certainly more nearly related in every respect than *Anemone Hepatica* is. Since making my note to this effect, I find that Bentham

and Hooker have placed *Syndesmon*, Hoffm., under *Anemone*, though Dr. Gray considered it a subgenus under *Thalictrum*. Taking all circumstances into account, it would seem a wise policy to go back to the old Linnean name of *Anemone thalictroides* and settle our rue anemone in the place where it can find its closest connections.

Cincinnati, Ohio. Jos. F. James.

Abnormal Trillium.—A specimen of *Trillium sessile* was lately brought to me which was quite interesting because of its departure from the normal type. Instead of having the parts all in threes, they were mostly in fives. There were five leaves, five sepals, five petals, eight stamens, four stigmas and a four-celled ovary. One of the petals had partly developed an anther on one side. The plant is very common here, but I have never seen a specimen like this before.

Cincinnati, Ohio. Jos. F. James.

Violet with Runners.—Does any one know whether it is common to find *Viola striata* producing long runners? I have found, in a locality near here, many specimens which have runners from 12 to 18 inches long, and I should like to know whether this is a common thing with white violets.

Cincinnati, Ohio. Jos. F. James.

Alfred Robson Young died in Brooklyn ,N. Y., April 12th, 1883, aged 54 years.

Mr. Young was born in York, England, January 14th, 1829, received his early education in Scarborough, and, at the age of fourteen, came to this country with his uncle, Mr. John Johnson, of Brooklyn. For more than forty years he was a collector and student of marine algæ, and made large collections in Europe, America and Australia, having resided in the latter country for a considerable time some thirty years ago.

Perhaps no man of the present generation was so intimately acquainted with the marine flora of New York Bay and adjacent waters as Mr. Young. An acute and accomplished botanist in this department, he was a gentleman of many graces and virtues of mind and character, and will be long and pleasantly remembered by all who shared his friendship. Though suffering from painful diseases, through many months and years, and which first deprived him of sight and at last of life itself, he was remarkably cheerful to the end, and never ceased to take a lively interest in his favorite plants.

Taunton, Mass. A. B. Hervey.

Carices Wanted.—Mr. Sereno Watson writes us that Dr. H. Christ, Rue de l'Arbre, 5, Basel, Switzerland, is engaged upon a revision of the European *Carices*, and desires to procure, by exchange or purchase, American specimens for comparison.

Austin's Musci Exsiccati.—Mrs. C. F. Austin, of Closter, N. J., writes us that she still has remaining two sets of the *Musci Appallachiani* and five of the *Supplement*, which she will dispose of at a low price to any one who desires to purchase them.

Plants Growing in Trees.—A long list might be made of the plants that domesticate themselves in trees. The elms of New Haven, Connecticut, furnish some interesting examples: currant bushes bearing fruit occur in many places, as on Hillhouse Avenue and the College grounds. A matrimony-vine (*Lycium vulgare*), flourishes in one of the huge trees in front of the Scientific School. I have seen gooseberry bushes in similar situations. Grass often figures as an air-plant, and a hollow in a trunk, some fifteen feet from the ground, is filled with a beautiful growth of ferns. I refrain from giving the specific locality for fear the progressive aldermen may cut the tree down.

Brick Church, N. J. HENRY BALDWIN.

Botanical Notes.

The Distribution of Ferns in the United States. In a paper upon this subject in the *Proceedings* of the American Philosophical Society (Feb. 2, 1883, p. 610), Mr. George E. Davenport says:

So far as now known, New York, Michigan, Florida, Vermont and California, in the order named, have the greatest number of species of ferns within their respective limits.

In the first, second and fourth of these States, the number has, in all probability, reached, or very nearly reached, its maximum, while in the third and fifth it is likely to be largely increased, and those States, from their favorable situations, climate, and comparatively extensive, unexplored territory, will undoubtedly lead all other States in the future, Arizona and Texas alone being at all likely to compete with them for the highest place.

If, however, we distribute our ferns according to the number of square miles of territory which each of the five first-named States contains, then Vermont will lead the others, her ratio being as 1 to every 226⅔ square miles, that for New York as 1 to 814, Michigan 1 to 1,191½, Florida, 1 to 1,289, and California 1 to 4,295½ square miles of territory.

Taking the extremes of the territorial limits, excluding the District of Columbia, which has 1 species to each 2½ miles of territory, Rhode Island gives us 1 species for each 38¼, and Delaware 1 to 75, as compared with Pensylvania's 1 to 109¼, Colorado's 1 to 4,200 and Texas's 1 to 7,878⅜, square miles.

If we take an average of the fern-flora for the different geographical sections of the United States, on the basis of the present list, New England gives us an average of 40 species for each State, the Middle Atlantic States 40, the South Atlantic 27, the Gulf States 27, the Central States 25, the Pacific States 23, and the Territories an average of 19.

The returns from most of the Territories are altogether too meagre at present to permit of any comparisons, and those already made will necessarily undergo considerable modification as the gaps in the lists for other States fill up.

But, while no absolutely reliable comparisons can be made, nor the precise limits of each species be determined from the present incomplete tables, we may ascertain from them with a tolerable degree of

certainty the range of certain species, and find material for some interesting observations.

Thus, we find the cosmopolitan *Asplenium trichomanes* and *Pteris aquilina* in thirty-five and thirty-nine out of the forty-eight States and Territories respectively, while their actual presence in a greater number may be safely assumed. *Polypodium vulgare* appears in thirty-three, with the same, or an even greater probability of its occurring in others in its favor, while its near congeners, *P. Californicum*, and *P. falcatum*, as well as *P. Scouleri*, are restricted to two or three States. Of the remaining Polypodiums, all but *incanum*, which appears in twelve States, are restricted to the single State of Florida, which furthermore monopolizes all the species we have in six genera, the tropical character of these being at once indicated by this fact.

The only other State (since the discovery of *Scolopendrium* in Tennessee has divided with New York the honor of that fern's presence) which may now claim a monopoly of a genus is New Jersey, the very local *Schizæa* being restricted to a portion of its limits, and again restricted to a single species.

Adiantum pedatum occurs in thirty-five States or Territories, while its congener, *A. Capillus-Veneris*, is restricted to thirteen, and the tropical *A. tenerum* to a single State.

The Osmundas are represented by one or more species in twenty-nine, *Onoclea* in twenty-eight States or Territories, and these probably occur in more, although not reported west of the Rocky Mountains. *O. sensibilis* extends as far west as Dakota and Montana, and, in the last-mentioned Territory, is said to have been discovered in a fossil state.

Cystopteris fragilis extends from Maine to California, through thirty-three States and Territories, apparently avoiding the South Atlantic and Gulf States, with the exception of North Carolina, while *C. bulbifera* occurs in twenty-five, covering a more unequal, but broader range south and west, the limits of which terminate in Louisiana and Dakota. *C. montana*, so recently discovered in Colorado by Brandegee, is reported elsewhere in the United States only from Alaska. The Aspidia are represented in forty-four, the Asplenia and Bortrychia in forty-one States orTerritories each, while the drought-resisting Gymnogrammes, Notholænas, Cheilanthes and Pellæas are almost wholly restricted to the arid regions west of the Rocky Mountains, a few scattering species only coming east, north, or south.

It is interesting to note the changes which have taken place in the number and distribution of our ferns since Redfield published his valuable paper on the "Geograhhical Distribution of the Ferns of North America," in the TORREY CLUB BULLETIN for January, 1875, and Mr. Watt his admirable review of Mrs. Lyell's Hand-Book in the *Canadian Naturalist* for 1870. Mr. Redfield enumerated 125 species, which have been increased up to the present time to 153 or 156, according as we may consider the claims of certain ferns to specific rank, or their right to a place in our fern-flora, while the range of the older species has been more or less extended.

Taking the number in the list accompanying this paper for a base, viz., 155, we have since 1875 an increase of 30 species.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, February 13th—the President in the chair and forty-two persons present.

The following Committees were appointed for the present year :

Finance Committee.—Addison Brown, John L. Wall and Lawrence Johnson.

Committee on Admission of Members.—W. R. Gerard and Benjamin Braman.

Herbarium and Library Committee.—N. L. Britton, Elizabeth G. Knight, Arthur Hollick and P. V. Le Roy.

Miss Knight exhibited specimens of *Limnanthemum lacunosum*, Griseb., having large, pellucid, submerged leaves.

A communication was read from Dr. R. J. Southworth, of Yonkers, in which the writer offered his herbarium to the Club. On motion, the gift was accepted, and the Secretary instructed to return the Club's thanks therefor.

Dr. J. S. Newberry delivered an interesting and instructive address upon the "Botany of the Arid Regions of Northern Mexico and Southern United States," which was illustrated by lantern slide views of the localities and objects mentioned in the course of his remarks.

At the regular meeting of the Club on Tuesday evening, March 13th, the chair, in the absence of the presiding officers, was occupied by Mr. Braman. There were thirty persons present.

Dr. Kunzé showed a specimen of *Casteria pulchra*, exhibiting an abnormal mode of growth ; *Mamillaria stellaris*, in flower and fruit ; and fruit of *Cereus serpentinus*, a cactus which is not known to have hitherto perfected its fruit in the United States. The flower was fertilized with pollen a year old taken from *Cereus Macdonaldiæ*. Dr. Kunzé stated that some of these night-blooming *Cerei* sometimes flower in the day-time, an occurrence probably due to a fall in the temperature.

Mr. Chamberlain read a paper on the algæ of New York Harbor and vicinity, illustrating it with a collection of mounted specimens.

Mr. Schrenk, referring to a note on tuckahoe in the BULLETIN for October, 1882, remarked that he had, contrary to a statement made therein, discovered cellular structure in the object, and exhibited mounted sections under the microscope which plainly showed this.

Mr. Britton, referring to an article in the BULLETIN for May, 1873, on the movement of pollen-grains in the calla, exhibited mounted specimens of the pollen under the microscope.

Four persons were elected active members, one person was elected a corresponding member, and four names were proposed for membership.

The Syracuse Botanical Club.—At the Annual Meeting of the Syracuse Botanical Club, March 19th, the following officers were elected for the ensuing year:

President, Mrs. Lillie Barnes; Vice-President, Mrs. Nellie Goodrich; Recording Secretary, Miss Mary Hotchkiss; Corresponding Secretary, Mrs H. S. Gifford; Treasurer, Miss Hattie Leach.

C.E.Faxon del. A.Meisel. Lith.

CHEILANTHES PRINGLEI, n.sp.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, June, 1883. [No. 6.

A New Fern.

By GEORGE E. DAVENPORT.

(Plate XXXIV.)

CHEILANTHES PRINGLEI, *n. sp.*—Rootstock slender, creeping, clothed with linear-lanceolate, acuminated brown scales with darker midnerves; stipites 1½′ to 4½′ long, reddish or chestnut-brown, furrowed along the face, clothed at the base with scales similar to those on the rhizoma, but lighter, less acuminate and oftener without midnerve, above sparingly with paler deciduous scales and chaff; laminæ 1′ to 2½′ long, nearly as broad, triangular or irregularly deltoid or ovate-deltoid, bi- to tripinnately divided into 5 to 7 pairs of opposite and spreading—in the smaller and sterile fronds—or, in the larger and fertile ones, alternate erecto patent pinnæ, lowest pair distant, sometimes shorter than the next, apex deeply pinnatifid, obtuse, both surfaces naked, dark green, rachises beneath clothed with light, nearly transparent—whitish brown becoming darker with age—ovate or linear-lanceolate scales with entire or sparingly toothed margins, those of the main rachis the narrowest; pinnæ ⅝′ to 1½′ long, lower unequally deltoid or ovate, obtuse, bipinnate, obliquely and pinnatifidly cleft toward the apex, uppermost oblong, pinnate or deeply pinnatifid; pinnules ⅛′ to ⅜′ long, the lower series usually the longest, ovate or oblong, obtuse, pinnately divided, or deeply cleft into cuneate-ovate or obovate, oblique segments which are again deeply cleft into cuneate, strap-shaped divisions, those of the largest segments again deeply cut into narrow, obtuse or blunt, cuneate lobes, the recurved tips in the fertile fronds forming distinct herbaceous involucres with entire or slightly crenulate margins; sori one to each ultimate lobe on the apex of a free veinlet; sporangia few, light brown, with about 18 rings. Spores light colored.

Habitat. Base of rocks, mountains of South-eastern Arizona. Collected by Mr. C. G. Pringle, May 2d, 1883.

I take pleasure in dedicating this beautiful fern to my friend Pringle, to whom I am under many obligations. Its delicately cut fronds, exquisite grace and loveliness suggest to my mind something of the refined tone and delicacy of its discoverer's own nature, and this dedication therefore seems to me doubly appropriate. The species is one of the most distinct and satisfactory that has been discovered for a long time, and is wholly unlike any known to our flora or heretofore described. The true form of the frond appears to be triangular, or at least the tendency is toward that form, although in some fronds the greatest breadth is across the second pair of pinnæ, as seen in those drawn by the artist, and, while the lower series of

pinnules are generally the longest, sometimes the upper series vary alternately with one or two as long as or longer than the lower, making an irregular outline. The shape of the segments and ultimate divisions varies considerably, but, in holding a fertile frond to the light, the general appearance is that of being finely cut into numerous ligulate divisions with cuneate bases. The young fronds before being unrolled (crosiers) are completely enveloped in a dense covering of whitish scales. The dimensions given for this species will no doubt be found to vary as more of it is collected. My thanks are due to Mr. Faxon for the pains he has taken with the drawing. The excellence and accuracy of his work is now too well known to need any special commendation, and the present drawing speaks for itself.

By a happy coincidence I am able to announce a double discovery by Mr. Pringle, and to accompany my description of his charming fern with a description by Mr. Peck of a new species of fungus found growing on the epidermis of the lamina in the form of pretty orange-colored dots, which, under the glass, resemble little cups filled with bright yellow spores. Mr. Peck has very kindly sent me his manuscript description, and expressed a wish to have it accompany my own description of the fern upon which the fungus grew, and it is accordingly given hereafter.

EXPLANATION OF PLATE XXXIV.—1. Plant, natural size. 2. Enlarged pinnule (second lower pinnule on second pinna). 3. Segment enlarged. 4. Lobe with one indusium turned back. 5. Scale from back of frond. 6. Scale from rhizoma. 7. Sporangium. 8. Spore.

A New Fern Rust.

By CHAS. H. PECK.

CÆOMA CHEILANTHIS, *n. sp.*—Spots indefinite, pallid or pale yellow; sori minute, rotund, slightly prominent, hypophyllous or occasionally amphigenous; spores globose or broadly obovate, regular, bright luteous or orange-colored, .00065 to .0009 of an inch long.

Living fronds of *Cheilanthes Pringlei*, Davenport, Arizona. May. Collected by C. G. Pringle; communicated by G. E. Davenport.

This fungus, though closely resembling *Cæoma filicum* Lk., (*Uredo filicum*, auct.), in external appearance, is readily distinguished from that species by its smaller, more regular and mostly globose spores. In *C. filicum* the spores are more or less angular and .0008 to .0011 of an inch long. In *C. Aspidiotus* (*Uredo Aspidiotus*, olim) which is regarded by some mycologists as a form of *C. filicum*, not only is the external habit different from that of both the preceding species, but also the prevailing form of the spores is more elongated and their length ranges from .0012 to .0017 of an inch.

Arceuthobium in New Hampshire.—I recently found near this place, in a swamp, on spruce trees, *Arceuthobium pusillum*, Peck (*A. minutum*, Engl.). The plants were in fruit (last season's plants), and the trees to which they were attached were in a dying condition. I have looked for *Arceuthobium* here before, but must have overlooked it, or it may be that it is of recent introduction here, which I doubt.

Hanover, N. H. HENRY G. JESUP.

A List of Grasses from Washington Territory.

By F. Lamson Scribner.

(By the wise liberality of Mr. Villard and his associates, who now control the Northern Pacific Railroad system, a very extended and complete economic survey of the territory tributary to these enterprises has for the past two years been prosecuted under the able direction of Professor Raphael Pumpelly. A year since a Division of Forage Plants and Statistics was organized, and Mr. T. S. Brandegee, who has for years done excellent botanical service, was appointed as observer and collector with the party operating in the Yakima River region and the adjacent parts of the Cascade Mountains in Washington Territory. Mr. Frank Tweedy was also with the party as topographer, and found time to make a fine collection of excellent specimens. The grasses obtained by these gentlemen have been critically studied by Mr. Scribner, and the result as given below shows the excellent outcome of their united labors.—W. M. Canby.)

Paspalum distichum, Lin.

Beckmannia erucæformis, Host.

Panicum capillare, Lin.

Panicum Crus-galli, Lin.

Panicum scoparium, Lam. Thurber, in Bot. Cal. ii., p. 259.

Spartina gracilis, Trin.

Alopecurus aristulatus, Michx.

Hierochloa borealis, R. & S.

Stipa comata, Trin. & Rupr.

Stipa viridula, Trin. Montana; Wm. M. Canby.

Oryzopsis cuspidata, Benth. (*Eriocoma*, Nutt.)

Phleum alpinum, Lin.

Sporobolus asperifolius, Thurber. Montana; Wm. M. Canby.

Sporobolus cryptandrus, Gray.

Sporobolus cuspidatus (*Vilfa*, Torr.) Montana; Wm. M. Canby.

Sporobolus depauperatus (*Vilfa*, Torr.)

Agrostis alba, L.? There is no *palea* manifest, but the general characters of the plant point rather to *A. alba* than to *A. elata*.

Agrostis tenuifolia, Bieb., Trin. Icon., 3. t .65. This appears like a slender, narrow-leaved, awnless form of *Agrostis exarata*, and has been so referred (No. 1,127, Kellogg & Hartford). It seems to be a well marked species, however, and so well accords with Trinius's figure of *A. tenuifolia* that I have little hesitation in referring it to that species. As I understand *A. exarata*, I am not prepared to unite this species with it.

Agrostis geminata, Trin., Uniflor. 207; Icon. 3. t. 28. A very delicate and pretty alpine species about a foot in height, the hair-like, spreading branches of the panicle few-flowered at the ends, and the flowering-glume slender awned.

Agrostis varians, Trin.

Agrostis foliosa, Vasey, ined. Equals Nos. 1 and 47 of Howell's Oregon coll.

Agrostis exarata, Trin. The same form as represented by No. 619 E. of Hall's Oregon collection. There is also a larger, more densely flowered and awned form, with strongly scabrous leaves.

Polypogon Monspeliensis, Desf.

Cinna latifolia, Griseb. (*C. arundinacea*, var. *pendula*, Gray.) A large form, with the rather small spikelets crowded at the ends of the branches, and having a rudiment a fourth of a line long.

Deyeuxia æquivalvis, Benth. (*Agrostis*, Trin.)

Deyeuxia Canadensis (*Calamagrostis*, Beauv.)

Deyeuxia Langsdorfii, Kth. (*Calamagrostis*, Trin.)

Deyeuxia neglecta, Kth. (*Calamagrostis*, Gærtn.; *C. stricta*, Trin.)

DEYEUXIA TWEEDYI, *n. sp.* Culms stout, 2—4 ft. high, smooth; leaves flat, ½ an inch wide or less, 2—4 in. long, with acute, rigid tips, minutely scabrous above, smooth beneath; ligule elongated, lacerated; panicle narrow, dense, 3—4 in. long, often interrupted below; spikelets crowded on the short (1 in. or less), more or less spreading, very compound branches; outer glumes 2½—3 lin. long, lanceolate, acute or sub-acuminate, membraneous and finely scabrous on the back, the upper 3-nerved below; flowering-glume a little shorter than the outer ones, of similar texture, and, like them, minutely scabrous (becoming firmer and sub-rugose in fruit), 5-nerved, two-cleft at the tip, with the lateral nerves sometimes projecting into four unequal teeth; awn stout, attached a little below the middle of the glume, about 3 lines long, twisted below, bent near the middle, and projecting beyond the glumes; palea broad and equalling its glume; hairs few, those at the side, which are longest, scarcely ½ line long; rudiment, with its hairs, about one-half the length of the floret; anthers large, 1½ line long.

Fig. 3.

Fig. 2.

Fig. 1.

(Fig. 1. Outer glumes. Fig. 2. Floret, with rudiment. Fig. 3. A stamen. All enlarged.)

Cascade Mountains, Washington Territory. Collected by Mr. Frank Tweedy of the Corps of Topographical Engineers in the service of the Transcontinental Survey. Mr. Tweedy has been a careful and zealous collector of the plants of the various sections of our country which he has visited, and it is with pleasure that I dedicate this species to him.

Deschampsia elongata, Munro. (*Aira*, Hook.)

Deschampsia calycina, Presl. (*Aira danthonioides*, Trin.)

Deschampsia cæspitosa, Beauv. (*Aira*, Lin.)

Deschampsia latifolia (*Aira*, Hook.)

Trisetum cernuum, Trin.

Trisetum canescens, Buckley. A slender, few-flowered form.

Trisetum subspicatum, var. *molle*, Gray.

Trisetum Wolfii, Vasey. (*T. subspicatum*, var. *muticum*, Bolander.)

TRISETUM BRANDEGEI, *n. sp.* Culms rather stout, erect or geniculate at the base, 1—2 ft. high, smooth, leafy; sheaths loose, longer than their internodes, smooth below, scabrous near the throat; leaves flat, about 6 inches long (the upper one 3—4 inches long and from 3—4 lines wide), scabrous on both sides with a few scattered hairs;

Fig. 6. Fig. 4 Fig. 5. Fig. 7.

margin very rough and occasionally ciliate near the base; ligule about a line long, ciliate; panicle, 4—6 inches long and less than an inch wide, densely flowered, more or less interrupted at the base, the erect and strongly scabrous branches in fascicles or half-whorls of five or more, 2 inches long, or less; spikelets flattened, about 3 lines long, 3—4-flowered, the flexuose and hairy rhachis prolonged into a slender pedicel above the upper floret; outer glumes broadly lanceolate, nearly equal in length, the lower frequently, the upper always, 3-nerved, scabrous on the keel from near the middle; flowering-glume 2½ lin. long, surrounded by a tuft of short hairs, minutely rough-tuberculate and rounded on the back, firm in texture, indistinctly 5-nerved, bearing just below the scarious and obtusely 2-lobed apex a short, scabrous and straight awn equalling or shorter than the lobes; grain smooth, linear, a line long.

(Fig. 4. Spikelet. Fig. 5. Floret, with portion of rachis. Fig. 6. Grain. Fig. 7. Apex of flowering-glume.)

Cascade Mountains, T. S. Brandegee and Frank Tweedy, August, 1882.

Allied to *Trisetum Wolfii*, Vasey, (*T. subspicatum*, var. *muticum*, Bolander), but much more robust in habit, outer glumes more nearly equal in size, flowering-glume less flattened, of firmer texture, rougher and constantly awned.

Danthonia Californica, Bolander.

Danthonia Californica, var. *unispicata*, Thurber.

Danthonia intermedia, Vasey. (*D. sericea*, Thurber, in Bot. Cal., Vol. ii., p. 294.)

Bouteloua oligostachya, Torr. Montana; Wm. M. Canby.

Phragmites communis, Trin.

Munroa squarrosa, Torr. Montana; Wm. M. Canby.

Kœleria cristata, Pers. Both the smooth and pubescent forms.

Eatonia obtusata, Gray.

Melica bulbosa, Geyer.

Melica fugax, Bolander (?)

Melica Hallii, Vasey (*teste* Vasey.)

Pleuropogon refracta, Benth. (*Lophochlæna*, Gray.)

Distichlis maritima, Raf. (*Bryzopyrum spicatum*, Hook & Arn.)

Poa purpurascens, Vasey, in *Bot. Gazette*, 1881–82, p. 297. Probably only a form or variety of *P. alpina*, L., and now so considered by Dr. Vasey himself.

Poa pulchella, Vasey. (A large form of the species, *fide* Vasey.) A slender grass, scarcely a foot in height, with narrow leaves and an open, rather few-flowered panicle. Spikelets 3—4 lines long, 3—4-flowered, outer glumes ovate, obtuse, the upper 2 lines, a little longer

than the lower and distinctly 3-nerved below; first flowering-glume 2 lines long, hairy near the base, scabrous above and scarious margined near the obtuse summit.

Poa cæsia, Sm., var. *strictior*, Gray.

Poa Nevadensis, Vasey, ined. (*P. tenuifolia*, var. *scabra*, Vasey, in herb.) Equals No. 474 of E. Palmer's collection of 1877.

Culms 2 feet or more high, scabrous below the panicle; sheaths and leaves scabrous, very narrow, and carinately folded when dry, those of the radical tuft 6—12 inches long, the upper leaf 1—3 inches long, ligule about 2 lines long, scabrous; panicle narrow, rather densely flowered, about 6 inches long, branches 2 or more at each joint, the lower about 2 inches long, the longer ones branched and flower-bearing above, naked below; spikelets 3—5 lines long, 3—8-flowered; glumes scabrous, the outer ones 1½—2 lines long, nearly equal or the lower a little shorter, obtuse or subacute, 3-nerved; first flowering-glume 2 lines long, a line broad, obtuse, nerves obscure, scarious margined above, and with a few very short hairs at the base; palea ciliate on the keels and scabrous between them.

The characters of this grass agree in many points with those of *Atropis scabrella*, Thurber, in Bot. Cal. ii., p. 310, but whether it be the same I am unable to say, having never seen any authentic specimens of that species.

A propos of Cicero Swamp.—By my last BULLETIN I learn that the Rev. Mr. Wibbe thinks poorly of this swamp. We of the Syracuse Botanical Club entertain different sentiments regarding it.

During the past two years we have visited it six times—once in May, twice in June, once in July, once in August, and once in September. We have encountered only one rattlesnake, and he gave us long and timely warning of his presence, so that several of us felt safe in watching him coil twice, in counting five of his rattles, and in listening till he began his third rattle (which, by the way, sounds like a bumble-bee under a glass, and no louder), then we walked away, he making no attempt to pursue us.

From the accounts of the dwellers in that vicinity, these snakes never attack one unless they are injured, and always give three warning rattles.

In our six visits we have seen but one other snake, and this neither troubled us nor we it.

Lodi Swamp, commonly called Tamarack Swamp, has been a rich field for botanists, yet not a very pleasant one for ladies to visit, as it borders on the Erie Canal, and one can never go there without meeting tramps or rough boys, who, to do them credit, have proved, like the rattlesnakes, not at all troublesome to us. But in "Tamarack" we always see many and large snakes. We have collected there, for years, all the plants Mr. Wibbe mentions, excepting, perhaps, *Solidago linoides* and *Viola renifolia*. I can find no description of the latter, so am not sure about it.

Mitella nuda is very common in Onondaga County. We first found it on a rocky hillside near Marcellus Station; since then we have found it in swamps and on hills. It can be collected in the

woods nearly the whole length (some six miles) of the Jamesville road.

In Cicero Swamp we have collected the following plants, which seemed rare to us, not finding most of them elsewhere in the County: *Drosera longifolia*, L., *Pyrus arbutifolia*, L., *Nyssa multiflora*, Wang., *Lonicera oblongifolia*, Muhl. (with pure white flowers), *Viburnum nudum*, L., *Solidago neglecta*, Torrey, *Vaccinium macrocarpon*, Ait., *Chiogenes hispidula*, Torr. and Gr., *Andromeda polifolia*, L., *Kalmia glauca*, Ait., *Lysimachia longifolia*, Pursh, *Menyanthes trifoliata*, L., *Abies nigra*, Poir, *Lemna trisulca*, L., *Scheuchzeria palustris*, L., *Calopogon pulchellus*, R. Br. (with pure white flowers), several other orchids rare here, *Smilacina trifolia*, Desf., *Juncus nodosus*, L., *Eriophorum vaginatum*, L., *E. Virginicum*, L., *E. Polystachyon*, L., and *E. gracile*, Koch (with their varieties), *Rhynchospora alba*, Vahl., *Carex trisperma*, Desv., *C. limosa*, L., *C. irrigua*, Smith, *C. folliculata*, L., *Botrychium simplex*, Hitch., and *Lycopodium inundatum*, L. Then, in the Clay Swamps, which are merely a continuation of Cicero Swamp, containing many more rattlesnakes if the reports we heard of them be true, we gathered *Geranium maculatum*, L. (with pure white flowers), *Trifolium hybridum* (which will probably be common soon), *Mikania scandens*, L., *Dalibarda repens*, L., *Chrysosplenium Americanum*, Schwein., *Epigæa repens*, L., *Ilex monticola*, Gray, *I. verticillata*, Gr., *I. lævigata*, Gr., *Nemopanthes Canadensis*, D. C., *Bartonia tenella*, Muhl., *Pogonia pendula*, Lindl., *Cypripedium arietinum*, R. Br., *C. acaule*, Ait., *Trillium erythrocarpum*, Mich., *Lilium Canadense*, L., and var. *aureum*, *L. superbum*, *L.*, *Ophioglossum vulgatum*, L., *Botrychium ternatum*, varieties.

If the manes of the ancient Romans return to visit the localities in Central New York that have been named for them they must suffer. Still, I think were I even Cicero I could endure to have the most miserable parts of that swamp named for me, could I return to see what we saw there one lovely day in June—a large mat of pale citrine *Sphagnum*, over which swayed a hundred or more maroon flowers of the pitcher-plant, while clustered at their feet were their quaint leaves of a deeper citrine, veined with maroon. If one were fond of fine coloring it was a sight to rejoice in, and one never to be forgotten.

Syracuse, N. Y. MARY OLIVIA RUST.

Contributions toward a List of the State and Local Floras of the United States.

IV. THE SOUTHERN STATES.

List of foreign Plants introduced into the Gulf States. By Charles Mohr. (B.)

In Bot. Gazette, Vol. iii. Logansport, 1878.

KENTUCKY.

Catalogue of the native phænogamous Plants and the Ferns of Kentucky. By C. W. Short, M.D. (A.)

In Transylv. Journ. Med., Vol. vi. Louisville, 1833.

(Supplementary catalogues by Profs. Short and Peters in the same journal, Vols. vii. and viii. 1834–1836.)

The Ferns of Kentucky. By John Williamson. (D.)
12mo, pp. 154. Louisville, 1878.

List of Timber Trees found along the south-central part of the State, from Columbus to Pound Gap. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part x., Vol. v., 2d ser. Frankfort, 1876.

Jefferson County.

Florula Louisvillensis. By H. D. McMurtrie, M.D. (A.)
In McMurtrie's History of Louisville, 8vo. Louisville, 1819.

Fayette County.

Florula Lexingtoniensis; or, a descriptive Catalogue of the phænogamous Plants indigenous to this portion of Kentucky. By C. W. Short, M.D. (D.)
In Transylv. Journ. Med., Vols. i. and ii. Lexington, 1828.

Barren and Edmonson Counties.

Report on the Botany of Barren and Edmonson Counties. By John Hussey. (A.)
In Geol. Surv. Ky., Part ii., Vol. i., 2d ser., pp. 32. Frankfort, 1876.

Greenup, Carter, Boyd and Lawrence Counties.

Report on the Forest Timber of Greenup, Carter, Boyd and Lawrence Counties. By N. S. Shaler and A. R. Crandall. (B.)
In Geol. Surv. Ky., Vol. i., new series. Frankfort, 1876.

Grayson, Breckenridge, Ohio and Hancock Counties.

Report on the Timber Trees of Grayson, Breckenridge, Ohio and Hancock Counties. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part ix., Vol. ii., 2d ser. Frankfort, 1876.

Boyle and Mercer Counties.

List of the flowering Plants and of the Ferns of Boyle and Mercer Counties. By W. M. Linney. (A.)
In Geol. Surv. Ky., Part xi., Vol. v., 2d ser. Frankfort, 1876.

North Cumberland, Bell and Harlan Counties.

List of Timber Trees of North Cumberland, Bell and Harlan Counties. By L. H. De Friese. (A.)
In Geol. Surv. Ky., Part ix., Vol. iv., 2d ser. Frankfort, 1876.

TENNESSEE.

List of Timber Trees of Tennessee. By J. B. Killebrew and Prof. J. M. Safford. (B.)
In Report on Resources of Tennessee.

ALABAMA.

Preliminary List of the Plants growing without cultivation in Alabama. By Charles Mohr. (A.)
24mo, pamphlet, pp. 56. Tuscaloosa, 1880.

MISSISSIPPI.

Flora of Mississippi. By C. L. Wailes. (A.)
In 1st Rep. Agric. and Geol. Miss. 1854.

LOUISIANA.

Catalogus Floræ Ludovicianæ. By J. L. Riddell, M.D. (A.)
In N. O. Med. and Surg. Journ., Vol. viii. New Orleans, 1852.

Flora Ludovicianæ. By A. Featherman. (B.)

In Rep. of Bot. Surv. South. and Cent. La. New Orleans, 1871.

Plaquemines County.

List of Plants, native and introduced, of Plaquemines County, La. Collected by A. B. Langlois. (A.)
8vo., pp. 4. No date.

ARKANSAS.

Collections towards a Flora of the Territory of Arkansas. By Thomas Nuttall. (C.)
In Trans. Am. Philosoph. Soc., Vol. v. Philadelphia, 1837.

A Catalogue of the Plants of Arkansas. By Leo Lesquereux.
In 2d Rep. of a Geol. Recon. of Midd. and South. Counties of Ark. Philadelphia, 1860.

TEXAS.

Plantæ Lindheimerianæ; an enumeration of the Plants collected in Texas, with remarks and descriptions of new Species. By George Engelmann, M.D., and Asa Gray, M.D. (C.)
In Journ. Bost. Soc. Nat. Hist., Vols. v. and vi.

Plantæ Wrightianæ Texano-Mexicanæ. An account of a Collection of Plants made by Chas. Wright, A.M., in an Expedition from Texas to El Paso in the summer and autumn of 1849. By Asa Gray. (C.)
In Smithson. Contrib. to Knowledge, Vols. iii and v.

Beiträge zur Flora von Texas. Von Adolf Scheele. (D.)
In Linnæa, Vols. xxi., xxii. xxiii., and xxv.

Plants collected during Capt. Marcy's Exploration of the Red River of Louisiana in 1852. By John Torrey, M.D. (C.) Washington, 1852.

List of the Fungi of Texas. By M. C. Cooke. In Ann. N. Y. Acad. Sci., 1878.

W. R. G.
N. L. B.

Notes from Nevada and Utah.—Mr. Watson identifies as *Podosciadium Bolanderi* a plant which has obcordate petals, and bracts tipped with an awn 4" long.

I was fortunate in getting good specimens of the extremely rare *Mentzelia congesta* at Hawthorn and Empire City, Nevada.

Antennaria Geyeri occurs in the mountains south of Reno, Nevada.

Pectocarya setosa occurs rather abundantly at Empire City, Nevada, and has geminate nutlets.

The Idaho plant, *Gentiana simplex*, occurs in the mountains of Southern Utah, as do also *Philadelphus microphyllus*, *Zygadenus glaucus* and *Iris Missouriensis*.

Sometime since, Dr. Gray directed the attention of botanists to the species of *Mentzelia* as fly catchers. Soon after, I had occasion to examine the leaves of *M. lævicaulis* late in the fall. The leaves are thickly beset with coarse hairs, which are furnished with several pairs of barbs pointing downward along them, while the top has an anchor-shaped summit twice as large as the other barbs. These

hairs stand so close together that the barbs almost touch. Thickly studding the leaf were many dead and dying mosquitoes, specimens of aphis, and other small insects. Some of these were caught by the head, but most of them were held by the legs or proboscis, as their heads were too large to slip between the barbs. All were more or less mutilated, probably by other insects. A sweet fluid was secreted by the leaf, and this attracted the insects. There was no evidence of any digestion going on, as none of the victims could get close enough to the surface of the leaf to be touched by the fluid.

A good character lies in the seed of *Acer grandidentatum*. The cavity in which the embryo lies is spherical, and always remains so, while the cotyledons are simply folded. In *Acer glabrum* the seed-cavity is compressed and deeply reticulated, so that the seed is crumpled. The cotyledons are strongly coiled.

Salt Lake City. MARCUS E. JONES.

Notes from Chemung County, N. Y.—In May, 1880, I collected an Umbellifer, which for some time I could not satisfactorily identify. The Rev. J. H. Wibbe, of Oswego, has now identified it for me as *Chærophyllum procumbens*, Lam. The only station known to me is in the town of Ashland, along the Chemung River, and it now is spreading along the south-west bank of the D. L. & W. Railroad track. This is its northernmost station, since Prof. Gray gives its geographical range as New Jersey, Illinois, and southward. I also found, last season, *Kœleria cristata*, Pers., on Sullivan Hill in this County. Correspondence and exchange are desired. I wish a specimen each of *Lygodium palmatum*, Swz., and *Asclepias rubra*, L.

Elmira, N. Y. THOS. F. LUCY.

A large Amelanchier.—I have recently discovered a shad-tree (*Amelanchier Canadensis*) standing in a meadow in the town of Glastonbury in this State, of the size, proportions and general appearance of an uncommonly fine old sugar-maple. The tree was subsequently measured by my friend Dr. G. W. Russell, of this city, who found its girth to be 8 ft. 8 inches, at 3 ft. 6 inches from the ground, and the spread of its branches to be 48 feet in diameter. The tree was in full bloom on the 19th inst.

Hartford, Conn., May 30th. G. P. DAVIS.

Funnel-shaped Leaves in Trifolium.—Miss Grace S. Hadley sends to us from Middlesex, Mass., specimens of *Trifolium pratense* which are provided, between the leaflets, with petioles that bear one or two smaller leaflets whose margins have cohered so as to form a conical cup or funnel.

Dr. Masters (Veg. Teratology) states that he has frequently met with specimens of *Trifolium repens* in which, on each side of the base of the petiole, the stipules had the form just indicated.

Abnormal Flowers.—Mrs. C. T. Tracy sends to us from Ripon, Wis., a sketch and description of a flower of *Trillium cernuum*, L., which has one petal and two sepals of the ordinary form and color, while the third sepal has been replaced by a perfect leaf, and the other two petals have a green stripe through the centre. Mrs. Tracy says: "A member of my botany class found a flower of *Sanguinaria Canadensis* with twenty-five petals, and a corresponding diminution of stamens. It was found among others that were in normal condition."

Botanical Notes.

On the Relation of Heat to the Sexes of Flowers.—At a meeting of the Botanical Section of the Philadelphia Academy of Natural Science, on April 9, Mr. Thomas Meehan referred to his past communications to the Academy, showing that in monœcious plants female flowers would remain at rest under a temperature which was sufficient to excite the male flowers to active development. Hence a few comparatively warm days in winter or early spring would bring the male flowers to maturity, while the female flowers remained to advance only under a higher and more constant temperature. In this manner the explanation was offered why such trees were often barren. The male flowers disappeared before the females opened, and the latter were unfertilized. He referred especially to some branches of *Corylus Avellana*, the English hazle-nut, which he exhibited before the Section last spring, in which the male flowers (catkins) were past maturity, the anthers having opened and discharged their pollen, and the catkins crumbling under a light touch, but there were no appearances of action in the female flower-buds. There were no nuts on this tree last season. The present season was one of unusually low temperature. There had not been spasmodic warmth enough to bring forward the particularly excitable maple-tree blossoms. The hazle-nut had not, therefore, had its male blossoms brought prematurely forward. He exhibited specimens from the same tree as last season, showing the catkins in a young condition of development, only half the flowers showing their anthers, while the female flower-buds had their pretty purple stigmas protruding from nearly all of them.

Mr. Meehan remarked that his observations the past few seasons had been so carefully made that he hardly regarded confirmation necessary, but believed the further exhibition of these specimens might at least serve to draw renewed attention to his former communications.

Cooke's Illustrations of British Fungi.—American subscribers to this work will regret to be informed that the premises of the plate-printers were recently destroyed by fire, and, with them, all the work in progress, including Part xviii. of the "Illustrations," which had just been completed. This will cause uncertain and unavoidable delay, but, as soon as possible, some arrangement will be made to continue the works on fungi and fresh-water algæ.

Botanical Literature.

We acknowledge, with thanks, receipt of the following papers from their authors:

The Bacteria: An Account of their Nature and Effects, together with a Systematic Description of the Species. By T. J. Burrill, Ph. D. 8vo, pamph., pp. 65. (From the 11th Rep. of Illinois Indust. University.)

The Mycologic Flora of the Miami Valley, Ohio. By A. P. Morgan. 8vo, pamph., pp. 30. (Reprint from the *Journal* of the Cincinnati Society of Natl. History.)

The Physiology of Protoplasmic Motion. By F. H. Engelmann, M.D. Translated by C. S. Dolley, M.D. 8vo, pamph., pp. 40. Rochester: Davis & Leyden.

Comparative Tables showing the Distribution of Ferns in the United States. By Geo. E. Davenport. 8vo, pamph., pp. 8. (From the *Proceedings* of the Amer. Philosoph. Society.)

The Growth and Structure of a Tree. By Prof. W. J. Beal. 8vo, pamph., pp. 8.

Cases of Mushroom Poisoning. By James D. Trask, M.D. 8vo, pamph., pp. 8. (Reprint from the *American Journal of the Medical Sciences.)*

Some Microscopic Distinctions between Good and Bad Timber of the same Species. By Dr. J. T. Rothrock. 8vo, pamph., pp. 6. (From the *Proceedings* of the Amer. Philosoph. Society.)

On the Structures which favor Cross-Fertilization in several Plants. By William Trelease. 8vo, pamph., pp. 31. (From the *Proceedings* of the Boston Society of Natural History.)

Catalogue of the Davenport Herbarium.—Supplement. March, 1883. By George E. Davenport. 8vo, pamph., pp. 8.

A Revision of the Genus Clematis of the United States, embracing Descriptions of all the Species, their Systematic Arrangement, Geographical Distribution and Synonymy. By Joseph F. James. 8vo, pamph., pp. 19. (From the *Journal* of the Cincinnati Soc. Nat. Hist.)

Some Algæ of Minnesota supposed to be poisonous. By J. C. Arthur. 8vo, pamph., pp. 12. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Voi. xi.)

Descriptions of Iowa Uromyces. By J. C. Arthur. 8vo, pamph., pp. 37. (From the *Bulletin* of the Minnesota Acad. Nat. Sci., Vol. xi.)

Correction.—Mr. Ravenel wishes to correct an error which he inadvertently committed in his note on the Jerusalem artichoke (p. 55), and which we carelessly allowed to pass unobserved, and that was the classing of the sweet with the Irish potato as an underground stem. All reference to the sweet potato should, of course, be erased from the article.

Fig. 1.

Fig. 3.

Fig. 2.

BOLETUS MORGANI, Pk.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, July, 1883. [No. 7.

New Species of Fungi.

By CHAS. H. PECK.

BOLETUS MORGANI (Plate XXXV.)—Pileus pulvinate, soft, glabrous, viscid, red or yellow, or red fading to yellow on the margin; tubes convex, depressed about the stem, rather long and large, unequal, subrotund, bright yellow becoming greenish yellow; stem elongated, tapering upward, adorned with long, narrow reticulations, yellow, the depressions red; the flesh of stem and pileus whitish tinged with red and yellow; not changing color when cut or bruised; spores olive-brown, .0007 to .0009 of an inch long, about half as broad.

Plant 4 to 6 inches high, pileus 1.5 to 2.5 inches broad, stem 3 to 6 lines thick.

Rocky hillsides, in woods of chestnut, oak and tulip-trees. Norwood, Kentucky. August. A. P. Morgan.

The color of the pileus is usually red on a yellow ground, and that of the stem is yellow on the elevations or ridges, and red in the depressions. The red disk of the pileus sometimes fades into yellow on the margin. In wet weather the anastomosing ridges of the stem swell out and become broadly winged, thereby giving the stem a peculiar shaggy or lacerated appearance. The species is related to *B. Russellii*, Frost, from which it is readily separated by its glabrous, viscid pileus and its longer spores. The two species constitute a natural section or subgenus, which is, so far as now known, peculiar to this country, and to which may be ascribed the following name and diagnosis:

§ LACERIPEDES. *Stem elongated, strongly venose-reticulated, the veins intumescent in wet weather.*

Pileus dry, hairy or tomentose-hairy, - - - *B. Russellii*, Frost.
Pileus viscid, glabrous, - - - - - - - - *B. Morgani*, Peck.

HEXAGONA FAVOLOIDES.—Pileus thin, coriaceous, sessile, narrowly and concentrically zonate, slightly sulcate, glabrous, somewhat shining, brown; pores pallid, then brownish, shallow, hexagonal, .028 to .042 of an inch across.

Decaying wood. Roatan Island. J. J. Brown, M.D.

Allied to *H. polygramma*, Mont., and *H. tenuis*, Hook., but unlike either in color and in the character of the margin of the pileus. In its color, and in the character of the zones of the pileus, our species very much resembles fresh specimens of *Dædalea confragosa*, Pers., from which it is separated by its thin pileus and the character of the hymenium. The pores are scarcely half a line in diameter and are

so regularly hexagonal as to be suggestive of the cells of a honey-comb. The zones of the pileus are narrow and subconcolorous.

MELANCONIUM POPULINUM. — Pustules prominent, erumpent through a longitudinal chink; stroma whitish, minute or obsolete; spores oblong, black, .0006 to .0007 of an inch long, oozing out and staining the matrix black or forming a black globule.

Dead branches of poplar-trees. Iowa. J. B. Ellis. (No. 3,637).

MELANCONIUM COLORATUM.—Pustules small, scarcely prominent; stroma minute, greenish-yellow; spores oblong or oblong-ovate, often slightly curved, nearly colorless, .0005 to .0006 of an inch long, .00025 to .0003 of an inch broad, oozing out and formimg a dull-reddish mass.

Bark of the tulip-tree, *Liriodendron Tulipifera*, Pennsylvania. J. B. Ellis. This species is related to *M. pallidum*, Pk., but the spores are smaller and the spore-masses of a different color.

UROMYCES UNITUS.—*Hymeniferous form:* Spots suborbicular, sometimes confluent, varying in color from yellow to sanguineous; peridia amphigenous, short, sometimes crowded and occupying the entire spot, sometimes concentrically arranged near the margin; spores subglobose to subelliptical, orange-yellow, .0008 to .001 of an inch long.

Teleutosporous form: Sori amphigenous, on the same spots as the *Æcidium* and intermingled with its peridia, slightly prominent, orbicular, blackish-brown; spores globose, minutely granular, .001 to .0011 of an inch in diameter; pedicel very short, hyaline.

Living leaves of *Calandrinia Leana*, Porter. Washington Territory. T. S. Brandegee.

RŒSTELIA INTERVENIENS.—Spots suborbicular, pallid or yellowish; peridia hypophyllous, short or moderately elongated, whitish or pale yellow, lacerated and splitting to the base, the cells thick and rough with striations; spores (when dry) very pale or whitish, subglobose, .0008 to .0012 of an inch in diameter, minutely rough, the epispore thick, .00016 to .00025 of an inch; spermogonia on the same spots, epiphyllous.

Living leaves of *Malvastrum Thurberi*, Lower California. April. C. G. Pringle. Also on leaves of *Erodium* (?) in Southern California. May. M. E. Jones.

The spores, in the dried specimens, are nearly white, but in the fresh state they are probably yellow or orange. The fungus at first sight might be taken for an *Æcidium*, a genus with which its pale spores and short peridia connect it, but the latter split to the very base as in the genus *Rœstelia*. The species, however is probably only the hymeniferous state of some teleutosporous fungus. This last remark is also applicable to the following *Æcidia*.

ÆCIDIUM AURIELLUM.—Peridia numerous, short, crowded, generally occupying the whole lower surface of the leaf, pale or yellowish, the mouth entire or subcrenulate; spores subglobose or subelliptical, golden-yellow, .0008 to .0011 of an inch long, usually containing one to three large, shining, yellow oil-globules, epispore thin.

Living leaves of *Cheiranthus Menziesii*, B. & H. Carson, Nevada. June. M. E. Jones.

This is a pretty fungus and very showy, even in the the dried state, by reason of the clear golden-yellow color of its spores.

ÆCIDIUM ISOMERINUM.—Spots pallid, thickened; peridia amphigenous, short, scattered or crowded; spores subglobose, ovate or elliptical, whitish (when dry) .0008 to .0011 of an inch long, epispore thin.

Living leaves of *Isomeris arborea*, Nutt. San Diego, California. March. M. E. Jones.

Sometimes the fungus occupies nearly the whole leaf, which, in such a case, is considerably thickened and distorted.

ÆCIDIUM ANISACANTHI.—Spots none or indistinct; peridia amphigenous, elongated, pinkish-gray, crenately lacerated at the apex; spores very variable in shape, subglobose, ovate, elliptical, oblong or oblong-pyriform, sometimes pointed at one end, yellowish or brownish yellow (in the dried state) .0009 to .0018 of an inch long, .0008 to 00095 broad.

Living leaves of *Anisacanthus Thurberi*. Arizona. June. C. G. Pringle.

SPHÆRELLA ARBUTICOLA.—Maculicolous, spots suborbicular, unequal, blackish or subcinereous, brown on the lower surface of the leaf; perithecia minute, black, epiphyllous, scattered or collected in small groups, piercing the whitened epidermis; asci oblong, sometimes narrowed above, .0016 to .005 of an inch long; spores crowded, narrow, colorless, uniseptate, .00045 to .0006 of an inch long. .00016 broad.

Dead leaves of *Arbutus Menziesii*, Pursh. Santa Cruz, California. July. C. G. Pringle.

The septation of the spores is rather obscure, but this is probably due to their being immature. The epidermis is slightly elevated around the perithecia and has there a whitish appearance.

MICROSPHÆRIA ERINEOPHILA.—Mycelium arachnoid, subpersistent; perithecia .003 to .004 of an inch broad, sometimes collapsed or pezizæform; appendages 6 to 12, shorter than or about equal to the diameter of the perithecia, colored, the tips paler and two to three times dichotomous; asci 4, sometimes 3 or 5, eight-spored; spores .0008 to .0009 of an inch long, .00045 to .0005 broad, usually containing one or two large nuclei.

On the *Erineum* of beech-leaves. Illinois. F. S. Earle and Prof. A. B. Seymour.

This fungus is closely related to *M. penicillata*, of which perhaps it may be a mere variety, but it is readily distinguished by its colored appendages and nucleated spores. Its habitat is very peculiar. In all the specimens seen it occurs only on the *Erineum*.

Proterogyny in Spartina juncea.—Has this been noticed? My attention was attracted to it this morning on the beach here. The plumose stigmas of all the spikes on a particular plant are protruded, while the stamens are still full and retained in the palets. In other plants where the purple anthers are prominent, I find the stigmas withered.

Buttonwoods, R. I. W. W. BAILEY.

New Species of Fungi.

By J. B. Ellis and Benjamin M. Everhart.

Steganosporium formosum. — The receptacles enclosing the spores imbedded in the inner bark and resembling true perithecia, depressed-globose (1$^{mm.}$), the apex adnate to the epidermis, which is there perforated to form an outlet for the spores, which are expelled at maturity in slender cirrhi, like fine black hairs, or collected in an incrusting mass around the orifice; spores broad, oblong-fusiform, 60–100x20–26μ, yellowish at first, soon becoming dark brown and muriform, the obtusely pointed ends subdiaphanous, borne on the apices of hyaline, jointed basidia, which spring from the inner surface of the cavity, the whole involved in mucus, and the spores at first with a broad, gelatinous envelope.

On dead branches of *Magnolia acuminata*, West Chester, Pa. On the same branches there is a *Melanconium* (?) with elliptical, uniseptate, 10–12x4μ. spores. E. H. S. & G., No. 411.

Stictis decidua.—Scattered, membranaceous, cup-shaped, elliptical, .3–.5$^{mm.}$ x .6$^{mm.}$ reddish brown, nearly closed at first by the incurved margin, at length open and finally deciduous; asci oblong, 35–40x6–7μ; paraphyses branched (?) and matted above, and bearing at their tips minute globose conidia; sporidia biseriate, fusiform, nucleolate, nearly straight, hyaline, 6–10 x 1–15μ.

On decorticated and decaying pine limbs lying on the ground. Newfield, N. J., March 1883.

Closely allied to *S. foveolaris*, Rehm, but distinguished by its different habitat, darker disk and deciduous habit.

Glonium triblidioides.—Emergent, oblong, ends obtuse, 1–2$^{mm.}$ x .5–.75$^{mm.}$, lips incurved, smooth, distant, leaving the sooty disk more or less permanently exposed; asci clavate-cylindrical, sessile, 80–90x 9–12μ, overtopped by the densely matted paraphyses, whose closely compacted, dark colored tips give the sooty color to the disk; sporidia uniseriate or partly biseriate above, ovate, uniseptate hyaline, 12–16x 5–7μ. In the fresh state the swollen disk entirely hides the margin.

On old fence-rails. Washington Territory. W. N. Suksdorf.

Cenangium asterinosporum.—Erumpent, forming tuberculiform clusters 2–3$^{mm.}$ in diameter and composed of 6–10 individuals closely crowded together so as to become angular and distorted from mutual pressure; disk convex or plane, black, smooth, immarginate, (.5–1$^{mm.}$), dirty white within; asci subglobose, 35μ in diameter; paraphyses (?); sporidia oblong-elliptical or subpyriform, subhyaline, granular, constricted in the middle, becoming 3-septate and submuriform, 15–20 x 6–8μ.

On living stems and branches of *Vaccinium corymbosum*. Newfield, N. J., throughout the year. The clusters are erumpent from the inner bark and do not appear to affect the wood beneath.

Peziza crinella.—Scattered, stipitate, pruinose, white, thin and very delicate; disk .25–.375$^{mm.}$ in diameter, margin fringed with short hairs, stipe scarcely equal in length to the diameter of the disk; asci oblong-cylindrical, 38–40 x 4–5μ, sessile: paraphyses (?); sporidia biseriate, clavate-fusiform, hyaline 9–12 x 2μ.

The tips of the fibres which form the cup project and form the marginal fringe. From *P. caricinnella*, Karst., to which this is closely allied, it differs in its narrower asci and smaller, simple, clavate sporidia. *P. Caricis*, Desm., has sporidia cylindrical, straight or curved, 6x1 μ.

On dead leaves of *Carex crinita* lying partly in water, on the banks of a rivulet in shady woods. West Chester, Pa., June, 1882. E. H. J. & G., No. 381.

NECTRIA CONIGENA.—Minute, membranaceous, smooth, orange-yellow, lighter and collapsing when dry; asci about 50x 7 μ; sporidia uniseriate or partially biseriate above, acutely elliptical, 2-nucleate, becoming uniseptate (?) 7–8 x 3–3.5 μ; ostiolum papilliform, minute. Perithecia with a few weak, white, radiating hairs at base.

Differs from *N. vulpina*, Cke., in its habitat, smaller and paler perithecia and rather narrower and more acute sporidia.

On old decaying cone of *Magnolia glauca*. Newfield, N. J., Oct., 1882.

A List of Grasses from Washington Territory.*

By F. LAMSON SCRIBNER.

GLYCERIA CANBYI, *n. sp.*—Perennial; culm 2—3 ft. high, stout, erect, simple, smooth; sheaths shorter than their internodes, smooth; leaves of the culm 3, flat, between 2 and 3 lines wide, the upper about 6 in. long, scabrous on both sides and especially rough on the back near the briefly involute, pungent tip; ligule broad, obtuste, 2—3 lin. long; panicle narrow, about 6 in. long, densely flowered, usually interrupted below, branches from 3—5 in a half-whorl, short (1—2 in.) and erect or ascending; spikelets 3 lines long, 3—5-flowered, the rhachis readily breaking up; outer glumes unequal, obtuse or acute, 3-nerved, the upper and larger one between 1 and 2 lines in length; flowering-glume about 2 lines long, strongly scabrous and rounded, 5-nerved, nerves terminating below the scarious and obtuse summit; palea a little shorter than its glume, shortly ciliate on the nerves.

Fig. 1

Fig. 3

(Figs. 1 and 2. Spikelets. Fig. 3. Outer glumes. Fig. 4. Anterior view of floret.)

Cascade Mts., Washington Terr., Frank Tweedy and T. S. Brandegee, August, 1882.

Fig. 2.

Fig. 4

Allied to *Atropis tenuifolia*, Thurber, and closely resembling some forms that have been referred to that species, as No. 634 of E. Hall's Oregon collection, but differing essentially from descriptions of that species and very unlike the specimens in the herbarium of the Philad. Acad. Nat. Sci. ticketed *Poa tenuifolia* by Nuttall himself.

* Continued from page 66.

Glyceria nervata, Trin.
Glyceria pauciflora, Presl.
Glyceria pallida, Trin.
Festuca microstachys, Nutt.
Festuca ovina, Lin.
Festuca rubra, Lin.
Bromus racemosus, Lin.
Bromus secalinus, Lin.
Bromus breviaristatus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa*, Hook.; Thurber, Bot. Cal. ii., p. 321.
Bromus Hookerianus, Thurber, Bot. Wilkes's Exped., 493; *Ceratochloa grandiflora*, Hook.; Thurber, Bot. Cal. ii., p. 321.
Agropyrum repens, Beauv. (*Triticum*, Lin.) Represented in the collection by several forms, one of which has the sheaths and leaves, as well as the lower portion of the culm, clothed with a soft pubescence.

Agropyrum dasystachyum (*Triticum*, Gray; *Triticum repens*, var. *dasystachyum*, Hook.) The specimens accord well with the description of *A. dasyanthum*, Schultes, and, if kept distinct from *A. repens*, perhaps should be referred to that species. The spikelets are sometimes developed abnormally, and one of these is shown in the annexed figure.
Agropyrum caninum, Reichenb. (*Triticum*, Lin.) Both the ordinary or typical form and the mountain form referred to by Dr. Thurber, in Bot. Cal., ii., p. 324, characterized as having large and spreading, usually much crowded spikelets with long, stout divergent awns. Equals No. 656 of Hall & Harbour's coll., 1862.
Agropyrum divergens, Nees. (*Triticum strigosum*, Lessing.) Equals 657 of Hall & Harbour's coll., 1862.
Hordeum nodosum, Lin. Thurber, Bot. Cal., ii., p. 325, (*H. pratense*, Huds.)
Hordeum murinum, Lin.
Elymus Canadensis, Lin.
Elymus Sibiricus, Lin.; equals No. 651 of E. Hall's Oregon coll.
Elymus condensatus, Presl.
Elymus Sitanion, Schult. (*Sitanion elymoides*, Raf.)

The Forms of Leaves.—Mr. Grant Allen's interesting papers on this subject must have engaged the attention of all evolutionary botanists, and very many serious doubts must be felt as to the alleged adequacy of his theory to explain the multiform and composite variations in leaf-forms. Having been attracted lately by the modifications of form to be found in the leaves of *Rhus toxicodendron*, it appeared to me possible to find in this common plant a point of exception to Mr. Allen's hypothesis. Mr. Allen assumes, putting the supply of atmospheric moisture out of the question, or assuming it to be uniform and sufficient, that a competition between neighboring leaves for the possession of carbon molecules, represented in the air by

carbonic anhydride gas, causes unequal growth along their mutual limits and their outlines become broken and assume irregular shapes; segments growing faster than others produce the diversified serrations, elongations, partings and fimbriations which characterize the leaves of different plants, all this however taking place in subordination to the ancestral peculiarities of the plant by which a general ground form or architectural type is preserved. Looking at the leaves of *R. toxicodendron*, we find them arranged in pedunculated, terminal sets of three, one distal and two lateral leaflets. The distal or central leaflet normally, and putting aside the divergent shapes found in this plant, is rhombic-ovate, equilateral, and symmetrically toothed on each side, the two side and proximal leaflets are subrhombic-ovate, inequilateral, and toothed conspicuously on only one side of the free margin. In other words, along the edges of the two lateral leaves where they come in conflict, especially with the edges of the terminal leaf, a restriction of growth takes place, and the usual lobation seen in the end leaf, and which may be considered typical, is suppressed, and on the margin, which is relieved from any competition, this lobation appears. Does not this contradict Mr. Allen's assumption? That there is a struggle for nourishment and that the terminal leaf, in the direct line of the sap's flow, is favorably placed, is seen by the slight growth of the halves of the side-leaflets facing the former, and the natural character of the halves away from it. But the tendency is to obliterate serration at the parts mentioned, and might, we should suppose, under persistent repetition, form an entire edge. A very similar condition of things, with some interesting details, is seen in the leaf-clusters of *Negundo aceroides*.* An interesting change of form in the leaves of the poison ivy takes place when they have been stung by a species of gall-insect (?) at the apex of a leaf. In the terminal leaf it produces an arrest of growth, a deep cleft, and lateral enlargement, which destroys the notched outline, enveloping the lobes in a rounded full blade.

Of course it is not difficult to explain the abortive character of the one side of the leaflets mentioned above. It is due to the predominant shade caused by the expanded sides of the terminal leaflet, which owes its vigour to its favorable position. The conditions presented here are apparently what Mr. Allen would wish, two neighboring leaves contending for the molecules of carbonic anhydride and evidently unequally matched, as appears from the result; but the result does not seem desirable for his theory, as the characteristic toothing is suppressed, not exaggerated in the weaker, and this notching, which he seems to regard as due to impeded growth, is best shown in the stronger competitor.

L. P. Gratacap.

The Fertilization of Opuntia.—For the purpose of adding brilliancy of color to the window-garden in front of my house, I planted in two separate boxes a large number of plants of *Opuntia vulgaris*, which I obtained from near Hartsdale, Westchester County, N. Y.,

* Mr. A. Hollick gave me the name of this tree, which I had previously observed in connection with this subject.

on the 15th of June last. All the plants when taken up were well set with large flower-buds, which opened a week later and lasted until the middle of July. During that time I watched about one hundred and thirty flowers out of a total of two hundred and ten during their period of flowering, and noticed with much interest the great sensitiveness of the stamens, which are very numerous in this prickly-pear.

The window-boxes have an eastern exposure, and consequently the sun passes out of view about one o'clock in the afternoon. The flowers opened about seven in the morning and closed shortly after two, or about an hour after the sun passed away, although they would have remained open two hours longer under its direct influence. During sunshine each flower would open for two consecuive days, but in cloudy weather for only one day. On the first day of the opening of a flower the pointed stigmas were hardly separated sufficiently to admit of the passage of a small-sized straw. But on the following day, under the influence of the sun's rays, the stigmas expanded to their fullest capacity.

Less pollen was observable on the anthers during the first than on the second day of flowering. Or, in other words, the longer a flower remained open the greater the number of pollen grains that were discharged from the anthers. And yet fructification seems to have been effected in nearly every case in which a flower opened for either one, or two days in succession. I now count about one hundred and ninety promising fruits.

The beautiful lemon-colored flowers of this *Opuntia* attracted many honey-bees, and their movements I carefully watched with a pocket-lens in hand on every fair or sunny day. A bee would alight on the mass of anthers, then push its forelegs down among the filaments, which were sufficiently compressed to admit of the body of the insect passing more readily down to the nectaries of the flower.

As soon as the filaments were released from the grasp of the insect, the stamens were suddenly thrown against the pistil, from which they slowly receded to their former position. I should judge that sometimes more than a dozen stamens were thus rudely seized by a honey-bee in its endeavor to reach the nectaries, the insect frequently making the circuit of the whole arrangement of stamens, and always coming up again to the surface of the anthers before taking a second plunge to the base of the corolla. Although the feet (legs) of the insect were covered with masses of pollen after visiting a flower, yet at no time do I remember seeing one crawl *over the stigmas*, whereby fertilization might have been insured. It seems to me that the pollen grains are thrown between the stigmas after the sudden movement of the stamens following the retreat of an insect.

I have also noticed flies of several species visit these flowers on a similar errand, this apparently being followed by the same movements of the filaments. On the 12th of July, I was collecting in Pelhamville, Westchester County, and there also observed a few late-flowering specimens of *Opuntia vulgaris*, on one of which I observed a large humble-bee going for his nectar; and how he did make the dust (pollen) fly!

From one of the joints of my plants there has exuded a straw-colored gum. The gum found on *Opuntiæ* is edible like that secreted by *Acacia vera* and *Prunus cerasus*.

New York, July 18th. RICHARD E. KUNZÉ.

Among the Palms and the Pines.—On the 28th of May, 1883, my father, H. C. Orcutt, and myself left San Diego City, Cal., on what proved a short trip into Lower California.

The first day rewarded us with two beautiful Abutilons with orange-colored blossoms and velvety leaves (*A. Berlandieri*, Gray, var., and another) and a new species of *Cordylanthus* found at the head of Tia Juana Valley near the boundary.

A little beyond, among the hills, was *Lupinus gracilis* among the rocks in company with *Phacelia Parryi*, both struggling for existence in so "dry a year," while further along we found *Acanthomintha ilicifolia*, the beautiful *Chorizanthe procumbens*, *Brewèria minima*, and others, thriving on the adobe hills (the whole surface of the latter cracked like the bottom of a dry mud-puddle), and, on similar ground, acres were covered with the red-flowered *Chorizanthe fimbriata*, forming a beautiful feature in the landscape as we entered Valle de los Palmas where we made our next camp among the mesquite, screw-bean and other trees—but no palms!

The next morning we proceeded through the valley till we noticed at our right, in a large cañon, two novel trees which proved to be palms, *Washingtonia filifera*, and on further exploration we found twenty still standing, but over fifty lying dead—cut down by the enterprising ex-governor that he might cover his house with their leaves!

Beneath the few remaining palms flowed a cool stream of water, enabling *Epipactis gigantea* and *Juncus xiphioides* to exist, while near by we found the last flower of *Lathyrus splendens*, *Lupinus albicaulis* as a small shrub, *Bærhavia viscosa*, *Galium pubens*, Gray, and others. *Mentzelia micrantha*, Torr. & Gray, with *Physalis crassifolia* were growing on the side of the cañon, the *Mentzelia* covering my clothes with its very tenacious brittle leaves which it was impossible to wholly remove.

May 31st found us in the evening at rancho Guadaloupe, 75 miles from San Diego by road, where we made our headquarters for a day, till our return. Here, in the evening, we found a new (?) *Phacelia* with white flowers and yellow centre which had strayed to the dry bed of the San Antonio Creek, where in the morning I also found an abundance of *Astragalus Sonoræ*, Gray, in fruit, and *Lupinus gracilis*.

Late in the morning of June 1st we left the camp and proceeded up the valley till we came to a cañon which led to Guadaloupe Mountains, credited with an altitude of 4,000 feet. Here we found many interesting plants at different altitudes. Among them were *Trichostema Parishii*, Vasey, *Mimulus Palmeri* (?), *Helianthus gracilentus*, Gray, *Actinolepis Wallacei*, Gray, at a low altitude, *Calochortus Weedii*, *C. venustus* above it, and, higher still, *C. Palmeri*, an *Allium*, *Dendromecon rigidum*, and many species of *Gilia*, one (a new species) being particularly conspicuous for its delicate, variegated blossoms.

After securing, near the top, specimens of the pine (*Pinus Coulteri*) which had attracted our attention we returned to the ranch, having walked about twenty miles in ten hours in the hot sun—repaid by over twenty interesting plants. During our return we found *Polycarpon depressum*, Nutt., *Monardella linoides*, Gray, and others, near Palm Valley, over one hundred species, two or more new, on the whole trip of eight days.

San Diego, Cal. C. R. ORCUTT.

Pinus Banksiana, Lamb.—This tree appears to considerably exceed the size given for it in our manuals of botany. Dr. Gray gives it as "a straggling shrub, or low tree, 5 to 20 feet high"; Dr. Wood as "a small tree"; Prof. Sargent, in his Catalogue of the Forest Trees of North America, says: "a low shrub or tree, rarely exceeding 20 feet in height." The Abbé Provancher's Essences Ligneuses de la Province de Quebec gives 30 to 40 feet as its maximum size.

I noticed, in July, many trees in the vicinity of Marquette, Mich., which were at least 70 feet high, rising straight up from a base over one foot in diameter.

N. L. BRITTON.

Clematis Viorna, var. **coccinea.**—Some time early in June of this year, on a trip to Chattanooga, I was fortunate enough to find on the side of Lookout Mountain, above the line of the Chatt. & Nash. R.R., two plants of *Clematis Viorna*, var. *coccinea*. They were strong and healthy and growing and blooming freely. It was a matter of astonishment to find here a species which has not, I believe, been before recorded east of Texas. The two known localities there are Austin and New Braunfels; and it is interesting to now find the form so far away from the only place where it has hitherto been found.

Cincinnati, O., July, 1883. JOS. F. JAMES.

Abnormal Cotyledons in Ipomæa.—I find in my garden a seedling of the morning-glory, *Ipomæa purpurea*, with what appears to be a supplementary cotyledon. The condition is better described by saying that one cotyledon is perfect, but that the other consists of *two* which are connate to near the middle. This is as if the plantlet had started with three cotyledons. The abnormal one has, in consequence, a triply retuse apex. The accompanying figure shows the condition.

Masters says, that "fusion frequently accompanies an increase in the number of cotyledons," and attributes the phenomenon, at least in some cases, to chorisis or to a cleavage of the original cotyledon. The venation in my own example would indicate the fusion of the two originally distinct leaves.

Providence, R. I. W. W. BAILEY.

Botanical Notes.

Fertilization of the Borraginaceæ.—The change of color in various borraginaceous flowers would seem to bear relation to their fertilization. Hermann Müller remarks in *Nature* (May 24, p. 81), that he has observed that insects visit exclusively those which are red or just beginning to change to blue. All the blue flowers which he examined in a locality about 2 yards broad and 20 long, where many hundred flowers of *Pulmonaria* were in all stages of development, proved to be empty of honey, and all which he observed with the aid of a lens, had the stigma already supplied with pollen; so that it would appear that, as in *Lantana* and *Ribes aureum*, the change of tint serves as a guide to insects visiting the flower.

Contraction of Vegetable Tissues under Frost.—At a recent meeting of the Botanical Section of the Philada. Acad. Nat. Sciences, Mr. Meehan referred to a prevalent opinion that the liquid in vegetable tissues congealed as ordinary liquid does, and expanding, often caused trees to burst with an explosive sound. Mr. Meehan made experiments with young and vigorous trees, varying from one foot to three feet in circumference. They were carefully measured in early winter when the thermometer was at about 40°, and again after they had been exposed for many days to a temperature below freezing point, and, at the time of measurement, to 10° above zero.

In no case was there the slightest evidence of expansion, while in the case of a large maple (*Acer dasycarpum*), 3 feet 11½ inches around, there appeared to be a contraction of ⅛ inch. This was the largest tree experimented with. In dead wood soaked with water, there was an evident expansion; and the cleavage with explosion noted in the case of forest trees in high northern regions may result from the freezing of liquid in the central or less vital parts of the trunks of trees.

In some hardy succulents, however, instead of expansion under frost, there was a marked contraction. The joints or sections of stem in *Opuntia Rafinesquii* and *O. Missouriensis*, shrink remarkably with the lowering of the temperature. As soon as the thermometer passes the freezing point, the shrinkage is so great that the whole surface has the wrinkled appearance presented by the face of some very aged person. A piece of *Opuntia Rafinesquii*, which, in November measured 4 inches in length, is but 3½ now, and is not half the thickness it was in the autumn. In the winter when the thermometer was down to 10° above zero, the penknife penetrated the tissue just as easily as in summer, and no trace could be discovered of congelation in the juices of the plant. Other succulents exhibited more or less signs of shrinkage under extreme cold. *Mamillaria Nuttallii* and *M. vivipara*, with *Echinocactus Simpsoni*, a mamillose form, drew the mammæ upwards, and had them appressed as closely as the spines would allow; and some species of *Sempervivum* did the same. This could only be accomplished by the contraction of the main axis from the apex downwards. *Sedum Hispanicum*, which has not a succulent axis, contracts its leaves into longitudinal wrinkles, presenting the appearance of being withered or dead. They expand again in a few days of temperature above the freezing

point. Specimens of this *Sedum* and of *Opuntia Missouriensis*, preserved just above freezing point under glass, did not shrivel; and a plant of *Echinocactus Simpsoni*, taken under cover, after the mammæ had been appressed by frost, expanded them to the summer condition in a short time afterwards.

Assuming from these facts that the liquids in plants which are known to endure frost without injury, did not congeal, it might be a question as to what power they owed this successful resistance. It was probably a vital power, for the sap of plants, after it was drawn from the tree, congealed easily. In the large maple-tree already referred to, the juice not solidified in the tree exuded from the wounded portions of branches and then froze, hanging from the trees as icicles often six inches long.

Photepinasty of Leaves.—W. Detmer proposes the term "photepinasty" for the epinastic position of leaves induced by light. The normal unfolding of the leaves is due to paratonic nutation. The light first induces stronger growth in the upper side of the leaf; and it is to this phenomenon that he proposes to apply the term. (*Journal* Roy. Micros. Soc.)

Reproductive Organs of Lichens.—The most recently published part of Minks's Symbolæ Licheno-Mycologicæ treats of the Hysteriaceæ, Acrospermeæ and Stictideæ. On the asci and paraphyses together the author bestows the term "thalamium," the "thecium" being that portion of the apothecium which includes these organs. The structure of this portion of the lichen may be referred to three different types: (1) The asci and paraphyses are both fertile hyphæ, which, in the latter case, have undergone arrest of development; and there are all intermediate stages between the two. (2) The paraphyses are formed a shorter or longer time before the fertile hyphæ. They are at a certain period indistinguishable from the hyphæ of the fundamental tissues of the fructification, and there is here no true thalamium. To this class belong the true Stictideæ and the greater part of the Hysteriaceæ. (3) Certain genera exhibit an intermediate structure between the first and second.

The structure and mode of formation of the spores are described in detail; and it is shown that in the anthonimorphous type (*Hysterium Smilacis*, *Stictis versicolor*, etc.) the mother-membrane takes no part in the abstriction of the spores, but that a new membrane is formed, the old one becoming gelatinized.

The germination of *Lophium læviusculum* is described. After the destruction of the asci, the spores remain for a shorter or longer time in the fructification, where they germinate; passing over ultimately into a chroolepis-like gonidema, and not as would be the case if Schwendener's hypothesis were true, developing into a fungus.

The two different forms of ascus correspond to the two different forms of spores. When the ascus has a double wall, the inner layer of which ultimately gelatinizes, then the spore has only a single membrane; while when the ascus has only a single wall the spores have a double membrane, the outer layer of which gelatinizes. (*Journal* Roy. Micros. Soc.)

Fig. 2.

Fig. 1

Fig 5

Fig. 4.

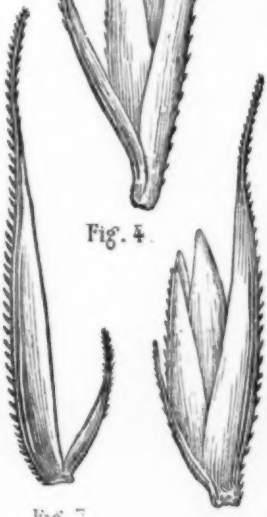


Fig. 7

Fig. 3.

Fig. 6

Fig. 8.

Fig. 9.

SPIKELETS OF SPARTINA.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X. New York, August, 1883. **No. 8.**

Notes on Spartina.

By F. LAMSON SCRIBNER.

(Plate XXXVI.)

Mr. Bentham, in his revision of the genera of Gramineæ, has removed *Spartina* from Chlorideæ and placed it in the Chamæraphis group of Paniceæ, associating it with the foreign genera *Chamæraphis* and *Xerochloa* of Brown and with *Stenotaphrum*, Trin., represented in the Southern States by *S. Americanum*, Schrank. The student whose observations are confined to American grasses will see little in common between *Spartina* and *Penesetum* or *Stenotaphrum*, the former immediately preceeding and the latter following it; and he will be little inclined to accept this new arrangement as one that is at all *natural*. He will continue to feel that the relations of *Spartina* are with the Chlorideæ, a tribe in which it has heretofore been placed, and allow the fact of the articulation of the pedicels below the outer glumes as an exceptional character in this genus, as it is allowed in some others which are included in Poaceæ.

In defining the *Chamæraphis* group Mr. Bentham states that the spikelets are nearly those of *Panicum*, but with the fruiting-glume usually less hardened; the inflorescence is nearly that of the paspaloid *Panica* or of Chlorideæ, but distinguished from the former by the rhachis of the partial spikes or fascicles or branches of the panicle being produced beyond the spikelets into a more or less rigid point. From the Chlorideæ they are separated by the articulation of the pedicel below the spikelet.

Exceptional cases presenting this leading character of the Paniceæ, *i. e.*, the articulation of the pedicel below the outer glumes, occur in Poaceæ and in other tribes besides Chlorideæ, and may not *Spartina* form an exception here? There are exceptions also to the character cited by Mr. Bentham as separating the Chamærapheæ from the paspaloid *Panica*. In *Panicum tenuiculmum*, Chapman, (non Meyer) from Florida, and in the East Indian *P. mucronatum*, Roth. (two species which may prove to be identical) the rhachis of the lateral spikes or racemes is prolonged beyond the spikelets into a rigid, subulate mucro or point.

Without entering further into the question respecting the proper position of *Spartina*, which I feel in no wise competent to discuss, I would like to record here a few cases of abnormally developed spikelets of one species of this genus that have come under my notice, drawing no conclusions more than to state that my observations have led me to regard *Spartina polystachya*, Willd., rather as a variety of

S. cynosuroides, Willd., than as a distinct species. The characters based upon the spikelets alone are not sufficient to separate them.

The spikelets represented in Figures 1 and 2 of Plate xxxvi. were taken from a specimen of *S. cynosuroides* collected at the outlet of Moosehead Lake, Maine, by Messrs A. H. and C. E. Smith in 1868. The spikes of the plant are unusually long peduncled and very loosely flowered, but that it is an abnormal growth is well shown by the spikelets represented.

Figures 3, 4 and 5 were drawn from spikelets of a specimen in the herbarium of Mr. Wm. M. Canby, collected at Atlantic City, New Jersey. In habit the plant was like *S. polystachya*. Figure 5 represents a double spikelet which has two upper outer glumes with but a single lower one. Nearly all degrees of cohesion were to be found in different spikelets on the plant.

Figures 6, 7, 8 and 9 illustrate in detail a two-flowered spikelet taken from a specimen of *S. cynosuroides* collected in Oregon by E. Hall. Most of the spikelets were normal, but all degrees in the development of a second floret were exhibited by others, the one here illustrated being the most complete. In some the opposing edges of the pales of the two flowers were united for nearly their entire length. Fig. 6 shows the 2-flowered spikelet complete. Fig. 7 exhibits the outer glumes. Fig. 8 shows the two florets removed from the outer glumes. Fig. 9 shows the florets separated.

New Western Compositæ.

By Edward Lee Greene.

Brickellia Cedrosensis.—A low shrub, with ascending, leafy branchlets bearing usually a solitary head; larger leaves a half-inch long, triangular ovate, coarsely and sharply toothed, on short petioles; those of the branchlets narrower and mostly entire, all roughish pubescent; heads 12–18-flowered; involucral scales acute; akenes smooth; pappus finely barbellate.

Collected on the Cedros Islands many years since by Dr. Veitch, and preserved in the herbarium of the California Academy. The species is allied to *B. frutescens*, Gray, of the main land, north-east of the islands, which has entire, veinless leaves, and heads with more numerous flowers.

Bæria carnosa.—Simple, or more or less branched from the base; the root somewhat fusiform-thickened, but strictly annual; stems a span high, slender but wiry, purple, and sparsely clothed with rather webby, white hairs; leaves wholly glabrous, narrowly linear, subterete and, with the involucres, thick and succulent; involucres campanulate, their large fleshy scales marked with a prominent, keel-like midrib; akenes roughish; pappus of 5 ovate, acuminate, chaffy scales which taper into a long slender awn.

Collected by the writer on the border of a salt marsh at Vallejo, April 15th, 1883. A most remarkable species, as to its succulent herbage, recalling certain similarly fleshy, maritime species in other genera of compositæ, as, for example, *Layia carnosa*, H. & A.

Lagophylla congesta.—Near *L. ramosissima*, but the stouter

stem usually simple; heads larger and numerous, in dense, glomerate clusters; floral leaves and involucral scales very villous, and beset with short-stipitate, or more commonly, quite sessile glands; akenes twice the size of those of other known species, and of a light grey; chaff of the receptacle united to the middle, thus forming a cup.

This interesting plant was collected by Dr. Kellogg in Mendocino County, Cal., as long ago as August, 1867, and is now in July, 1883, brought in from Mt. Yamulpais, near San Francisco, by that most diligent gatherer of rare Californian plants, Mrs. Kate Curran. Resembling *L. glandulosa* in being a glandular species, if these glands were overlooked; and, if it had a branching mode of growth, it would pass for a ranker *L. ramosissima.*

SENECIO CLEVELANDI.—Glabrous and glaucous; stem rather stout, 1½–2 feet high, few-leaved above and bearing numerous middle-sized, paniculate-corymbose heads; lower leaves numerous, rather succulent, ovate-oblong, entire, 2–3 inches long, tapering to long petioles; involucre broad, sparingly calyculate, its scales with lanceolate, acuminate, green tips; rays deep yellow; akenes short and small, prominently 4- or 5- angled.

Indian Valley, Lake County, Cal., D. Cleveland.

The following species, from another district, resembles this in foliage, but not otherwise, namely:

SENECIO LAYNEÆ.—Two feet high, glabrous throughout, strict and simple leaves mostly radical, linear lanceolate, entire, 3–4 lines wide, an inch or two long, on petioles of nearly equal length; the few cauline ones similar, though less obviously petiolate heads 5–7, corymbose, all but the central one on peduncles 2–3 inches long, large and showy; involucre campanulate, many-flowered, more than ½ inch high, naked at base; rays 7–10, oblong-linear, ¾ inch long, orange-yellow; the merely convex style-tips bearing 3 or 4 conspicuous central bristles, and numerous shorter ones toward the circumference.

El Dorado County, Cal., on Sweetwater Creek, not far from Folsom; collected in May, 1883, by the very zealous and efficient Mrs. Kate Layne-Curran, to whom I gladly dedicate it. It is a near relative of the rare *S. Greenei*, Gray, thus far collected only by the writer, and that seven years ago, in the neighborhood of the geysers, in Sonoma County.

SENECIO ACTINELLA.—Acaulescent, at first arachnoid-woolly; leaves all radical, obovate to oblanceolate, spatulate, their margins strongly crenate-dentate, an inch or two long, including the broad petiole, and ½ inch or more in breadth, coriaceous, veinless, at length glabrate, and persistent through the winter; scape solitary, 6–10 inches high, bearing a single large head; involucre campanulate, ½ inch high, the calyculate scales few and wrapped in wool; rays 9–12, narrow, pale yellow; style-tips bristly-fringed.

Rocky woods in the northern part of Arizona, near Flagstaff; collected by H. H. Rusby, June, 1883. A fine new species, nearest to *S. canus*, from which it is distinguished by its crenate-toothed leaves, strictly monocephalous scapes, and large heads.

SENECIO ARIZONICUS.—Slightly webby-woolly at first, at length

glabrate; leaves mostly radical, numerous, and of a fleshy texture, ovate-oblong, obtuse, often a little cordate at base, strongly cuspidate-toothed, 1½ inches broad, 3 inches long, on petioles of almost equal length; stem 1½ feet high, slender, leafless, or with a few large and small bracts; corymb lax; heads middle-sized, on slender peduncles; involucres with a few almost filiform calyculate scales or bracts at base; rays 9–12, yellow.

Lynx Creek, in Northern Arizona, May 31st, 1883; collected by H. H. Rusby.

MICROSERIS ACUMINATA.—Near *M. Bigelovii*, but larger, the scapes more than a foot high, and rather stout; leaves pinnately parted into numerous, narrowly linear division; akenes only slightly contracted at summit, ¼ inch long; pappus ¾ inch long, consisting of 5 linear-lanceolate scales, each tapering very gradually into a short, slender awn.

Collected, in a few depauperate specimens, near Vallejo, in April 1883; and also, at about the same date, in the Sacramento Valley, by Mrs. Kate Curran, her specimens being of a strong, luxuriant growth. Dr. Gray informs me that it was even long ago collected sparingly by Bigelow, on Mark West's Creek, and that it has been referred, first to *M. Douglassii* and later to *M. Bigelovii*.

TROXIMON HETEROPHYLLUM.—This will apparently have to be the name of the North American plant which has been for some years past called *T. Chilense*, Gray. (Proc. Am. Acad., ix., 216, and Bot. Cal., i., 439.) The Chilian plant, for which Dr. Gray's specific name will be retained, differs in having considerably larger akenes, which are always all alike in the same head, and a shorter stipe to the pappus.

The North American plant runs into varieties so remarkable that, on two of them, so acute and able a botanist as Nuttall founded genera; and I even now doubt if they do not merit the rank of species. However, since my venerated friend Dr. Gray (who, by the way, has lately, and independently of my fresh specimens and notes, reached also the conclusion that our species is distinct from the Chilian) regards them as mere varieties, I here so place them; namely:

var. CRYPTOPLEURA.—Outer akenes nearly globose inflated and hardly striate, the inner of normal thickness and also barely striate, not at all winged. This is the *Cryptopleura Californica*, Nutt., and *Macrorhyncus Californicus*, Torr. & Gray. Although hitherto accounted very rare, and thought to be perhaps a merely abnormal state not likely to recur, I have this year found plenty of it in two patches a quarter of a mile distant from each other, though both within the limits of the town of Berkeley.

var. KYMAPLEURA.—Outer akenes with broad and strongly and beautifully undulated wings, the inner merely striate. This is *Kymapleura heterophylla*, Nutt., and also *Macrorhyncus heterophyllus*, of the same author. It is the most common form of the species in the central part of California.

Besides these striking varieties, which do not show any signs of running together, there are other forms, namely, one with akenes all

alike, and none of them much ribbed, another with the outer akenes ribbed (not corky-winged) and very hirsute.

The species should be collected abundantly in all localities where it occurs, and the specimens diligently compared. I regard it as an interesting subject of future investigation.

New Species of Fungi.

By J. B. Ellis and B. M. Everhart.

Diaporthe (Valsa) Ellisii, Rehm (*in lit.*).—Stroma cortical, without any circumscribing line; perithecia numerous (15–20), .5$^{mm.}$ in diameter, crowded, subcircinate, raising the bark into small pustules, through the centre of which bursts the brown convex disk pierced around its margin by the black, obtuse, dot-like ostiola; asci-subclavate, 57x8μ; sporidia biseriate or overlapping, narrowly elliptical, 4-nucleate, and often slightly constricted in the middle, 11–15x3.5–5.5μ.

With a *Cytispora*, the spores of which are oblong, hyaline, 4-nucleate, 8–11x2–2.5μ and issue in an orange-colored mass.

Closely allied to *Diaporthe carpinicola*, Fkl., and *Valsa Carpini*, Fr.

On dead branches of *Carpinus Americana*. West Chester, Pa. June, 1882. E. H. J. & G. No. 372.

Valsa lasiostoma.—Perithecia circinating, .33–.5$^{mm.}$ in diameter, globose, and tuberculose-roughened, lying on the suface of the inner bark, or slightly bedded in it, their long (100–150μ), slender, cylindrical, decumbent necks converging and piercing the epidermis in a group, but not united in a disk; asci (spore-bearing part) 35–40x4–5μ; sporidia cylindrical, hyaline, nearly straight, 5–6 x 1.5–2μ.

The ostiola are slightly swollen above, and, with the exception of the bare, black, obtuse tips, are covered with an olive-brown pubescence as in *Sphæria barbirostris*, Dufour, from which this scarcely differs in any respect except in its circinate perithecia.

On decaying white oak limbs lying on the ground. Newfield, N. J. March, 1883.

Cucurbitaria Coremæ.—Perithecia at first subcuticular, but finally throwing off the epidermis, ovate, black, rough, .16–.33$^{mm.}$ in diameter, ostiola broadly papilliform on obtuse conic; asci cylindrical, 150x15μ; sporidia uniseriate and oblique or partly biseriate, elliptical or oblong-elliptical, yellow at first, becoming finally deep brown, about 7-septate, with some partial longitudinal septa, and mostly constricted in the middle, 20–25x7–9μ.

On dead branches of *Corema Conradii*. Willow Grove, N. J., November, 1883.

Lophiostoma stenostomum.—Perithecia scattered, globose, .25$^{mm.}$ in diameter, covered by the fibres of the bark, which is pierced by the narrow, slightly compressed ostiolum; asci clavate-cylindrical, 75–90x6–7μ; paraphyses filiform, abundant; sporidia biseriate, fusiform, slightly curved, yellowish, nucleate and uniseptate at first, becoming 3-septate and more or less constricted at the septa, 18–22x 3–3.5μ.

Accompanied by a *Phoma* with small, subglobose spores in perithecia scarcely different from the ascigerous ones except in wanting

the prominent ostiolum. Differs from *L. subcorticale*, Fckl., in its narrow ostiolum and smaller sporidia.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

SPHÆRIA (DIDYMELLA) RAUH.—Perithecia scattered or 2–3 together on the surface of the inner bark, and covered by the thin, loosened epidermis, which is pierced by the papilliform ostiolum; asci 35–30x6–7μ; paraphyses slender; sporidia biseriate, oblong-fusiform, uniseptate, constricted and slightly curved, with a faint, bristle-like appendage at each end, yellowish, with a nucleus in each cell, 7–8x15–2μ.

On dead branches of cultivated roses. Bethlehem, Pa. May, 1883. E. A. Rau.

SPHÆRIA (DIDYMOSPHÆRIA) CUPULA. — Perithecia scattered, innate, covered, except the papilliform ostiolum, by the blackened epidermis, convex-hemispheric when fresh, collapsed when dry; asci 75x7μ; sporidia elliptical, brown, uniseptate, uniseriate, 9.5–11.5x 4.5–5μ.

Sphæria diplospora, Cke., has sporidia 13–16x5–7μ, and perithecia not collapsing.

On dry oak-leaves still hanging on the limbs. Newfield, N. J. May, 1882. Found also on *Phytolacca* and *Desmodium*.

SPHÆRIA (THYRIDIUM) ANTIQUA.—Perithecia mostly solitary, globose, .25–.33$^{mm.}$ in diameter, buried in the substance of the bark, sometimes two or three together, their thick walls united and covered by the fibres of the bark, which is blackened above them and raised into little tuberculiform pustules; ostiola papilliform, at length perforated; asci cylindrical, 75–80x10μ; paraphyses filiform, abundant; sporidia uniseriate, oblong-elliptical, at length 3-septate and submuriform, 17–19x7μ, brown.

On the inner surface of loosely hanging bark of grape-vines. Newfield, N. J. May, 1883.

Some New Texan Plants.

By S. B. BUCKLEY.

ZANTHOXYLUM TEXANUM.—Unarmed, leaves trifoliate, leaflets ovate, obtuse, repandly crenate, subrevolute, smooth on both sides, punctate, petioles 4″–6″ long, lateral leaflets serrate, petiole of terminal one 3″–6″ long; racemes terminal, compound, pedicels short, with minute, acute, bracts and bractlets; divisions of calyx broadly ovate, acute, ovules 1–2, seeds not seen.

A large shrub 4–6 feet high, thickly branched; younger branches greyish brown, much punctated. The branches when broken have the aromatic odor peculiar to many species of the genus.

Differs from *Z. ternatum* of the West Indies in its terminal racemes and crenate leaflets. Near Corpus Christi, Texas.

BUMELIA TEXANA.—Leaves ovate or subcuneate, smooth on both sides, and of the same pale green color, 1′–1½′ long and about ½′ wide, petioles longer than the pedicels, being about 4″ long, smooth; calyx broadly ovate, subobtuse; corolla yellowish white, but little

longer than the calyx; petioles and midrib of the under sides of some of the leaves showing a slight pubescence under the microscope; fruit ovoid-ovate or elliptic in outline, 3″–4″ long and about 3″ broad.

A shrub or small tree. Smaller branches with dark reddish brown bark, rigid and sub-spinose, the leafy and fruit-bearing spines 1′–3′ long.

Mountains near the lower crossing of the Pecos River on the road from Fort Stockton to old Fort Lancaster and the head of Devil's River.

BUMELIA MONTICOLA.—Very spinose; leaves smooth on both sides, a little paler beneath, oblong-ovate, cuneate at the base, petiolate, 1′–1½′ long and ¼′–½′ wide, their under surface reticulately veined; petioles 3″–4″ long, about equal in length to the pedicels; calyx broad ovate, acute or sub-acute, smooth; fruit globose, the longitudinal diameter a little the greater, being about 3″ long; spines 1′–2′ long, often bearing leaves and fruit; smaller branches smooth, greyish brown, forming obtuse angles opposite their junction with the spines, with generally a warty protuberance at the base of each spine; flowers not seen.

A straggling shrub 3–9 feet high, with smooth reddish brown bark. Moutains of El Paso County, N. W. Texas.

Quercus Durandii, var. SAN SABIA.—This is a small oak seldom more than ten feet high, generally only from four to six feet, growing in dense thickets on some of the limestone hills of San Saba and its adjacent counties, Texas.

It has small, obtusely lobed leaves, which, when old, are nearly of the same color and smooth on both sides; when young, glaucous and sub-pubescent beneath; acorn oblong-ovoid, cup shallow, one-third the length of the acorn. Bark of trunk and branches light grey and scaly. Called "shin oak." Bark, acorns and cups very much like those of *Q. Durandii*, and so much so that it can only be considered as a well marked variety of it.

It has been called by Engelmann a variety of *Q. undulata*, and is placed thereunder in Prof. Sargent's Synopsis of the Trees of North America, and, in the same work, on the same authority, *Q. Durandii* is called a variety of *Q. stellata*; but these authorities now admit *Q. Durandii* to be a good species.

QUERCUS VASEYANA.—Leaves apparently deciduous, with shallow, repand, acutely toothed lobes and sub-mucronate teeth, smooth on both sides, or slightly downy and paler beneath, mostly cuneate at the base, rarely rounded, lanceolate or lance-ovate, petiolate, 1′–2′ long and ⅓′–1,′ wide; petioles 1″–2″ long; acorns oblong-ovoid, smooth, shining and of a pale chestnut color, 6″–7″ long and about 4″ wide; cups sessile, their greyish-brown scales tumid, triangular ovate, acute.

A shrub or small tree of the class of black oaks. On the mesas of the cretaceous limestone mountains near the lower crossing of the Pecos, and also in the valley of the Devil's River of Western Texas.

Named in honor of Dr. Vasey, botanist of the Agricultural Department at Washington, D. C.

Potamogetons in Western New York.—While spending a few days of the summer of 1882 in Western New York, I examined some of the lakes and streams of Wyoming, Genesee and Livingston Counties for species of *Potamogeton*. The results are given below, with the reservation, however, that they do not profess to be exhaustive, since time enough was not at my command at every locality to attain this end. The examination was carried far enough to see that the waters of that region still need to be searched more carefully than has yet been done to obtain a complete knowledge of the geographical distribution of these difficult and somewhat neglected plants.

The localities chiefly noticed were Silver Lake and its outlet at Perry, Wyoming County, Hemlock and Conesus Lakes, Livingston County, and Oatka Creek and several smaller streams of Genesee and Wyoming Counties. Fourteen species were found with considerable variation on the part of some, and are as follows:

P. natans, L., Silver Lake and Oatka Creek.

P. Claytonii, Tuckerman. Same localities, and Hemlock Lake and its outlet.

P. spirillus, Tuckerman. Hemlock and Conesus Lakes.

P. lonchites, Tuckerman. Hemlock and Conesus Lakes.

P. amplifolius, Tuckerman. Oatka Creek and the three lakes.

P. graminius, L. Some forms belonging to the variety *heterophyllus*, Fries, and others that are difficult to bring under the head of any varieties given in the books, the species being so polymorphic. Conesus Lake and Oatka Creek.

P. lucens, L. Oatka Creek.

P. perfoliatus, L. Either the variety *lanceolatus*, Robbins, or inclining to this, though some forms have very short leaves. The three lakes and Oatka Creek.

P. zosteræfolius, Schumacher (*P. compressus*, L. [ex Fries.]) Silver and Hemlock Lakes.

P. pauciflorus, Pursh. Silver Lake and Oatka Creek; also abundant in brooks and pools.

P. lateralis, Morong. (*Bot. Gaz.*, May, 1880.) Hemlock Lake.

P. pusillus, L. Principally the variety *vulgaris*, Fries. Silver, Hemlock and Conesus Lakes.

P. pectinatus, L. Silver, Hemlock and Conesus Lakes.

P. marinus, L. Hemlock and Conesus Lakes.

NOTES.—*P. Claytonii*. Those taken from Oatka Creek, near the village of Wyoming, had remarkably long floating leaves like some I had found at Ludington, Mich. They were in some cases 4–4½ inches long, and the petioles of these and of specimens from Silver Lake were usually from 1–2 inches long.

P. amplifolius was one of the most common species, being found quite generally in all mill-ponds and lakes, and streams whose depth was sufficient for its growth.

P. pauciflorus. This was the only species seen in brooks and in Oatka Creek, between Warsaw and Wyoming, with one exception (*P. Claytonii*). It commonly occurred in nearly all pools and brooks where the water, supplied by springs, or oozing out from

neighboring hills, did not fail on account of the summer heat. All the forms were of the coarsed-leaved kinds, the leaves frequently having a length of 2–3½ inches, and a corresponding width, being 3–5-nerved. The fruit, in capitate clusters, and with the keel more or less crested and notched, was very abundant. In these characters it approaches *P. Niagarensis*, Tuckerman; but, according to Mr. Morong, to whom some of the most marked specimens were submitted for comparison with type specimens in Robbins's herbarium, they are not quite identical. This great variability of leaves, and to some extent of fruit, both of which were carefully studied in specimens gathered in many localities, and under diverse conditions of growth, seems to lead conclusively to the opinion that no well marked line of separation can be drawn between *P. Niagarensis*, Tuckerman, and *P. pauciflorus*, Pursh; and that the former should be regarded as a variety of the latter. The same is true if based on a comparison of specimens collected in several quite widely separated localities in the West and North-west.

P. pusillus. Specimens of this would have to be classed with the variety *vulgaris*, Fries, sometimes approaching var. *major*, Fries, but more often var. *tenuissimus*, Mertens & Koch. In Silver Lake three forms were noticed, a common one with stems often 4½ feet long, but with fruit immature; a second with stems also long, of a reddish or pink color, and spikes of fruit emersed; a third with fruit larger and longer than usual, somewhat oblong, with a rather long, recurved style, the sides of the fruit impressed; spikes interrupted; stems 3–5 feet long.

P. marinus. This was very abundant in Hemlock Lake, in water 1½–3 feet deep, frequently in beds completely covering the bottom. The stems were usually long for the species, being about one foot in length, and the fruit copious. It was detected nowhere in the shallowest water nearest the shore, this ground being occupied almost invariably by *P. spirillus*, equally common but not in so dense beds. That found in Conesus Lake was not so tall, nor very common, as far as examination was made.

It may be of interest to state in connection with this as an evidence of the purity of the water of Hemlock Lake, from which the city of Rochester takes its water supply, that Potamogetons gathered there were almost wholly free from the earthy sediment which usually clings to these plants and is very troublesome to the collector, marring the looks and cleanness of his specimens. Chemical analysis has shown that the water of this lake ranks with the purest in the State. Species of *Potamogeton*, found in the neighboring Conesus Lake, whose water looks equally pure to the eye, were, however, quite thickly coated with an earthy deposit.

The time of these examinations was between July 22d and Aug. 9th, and the greater part of the species found showed some mature fruit, generally essential for complete identification.

Englewood, Ill. E. J. Hill.

Pinus Banksiana.—In the July number of the Bulletin (p. 82), Mr. N. L. Britton calls attention to the fact that our botanical writers

have commonly understated the size of Banks's Pine (*Pinus Banksiana*, Lambert), Gray describing it as "a straggling shrub or low tree," and other authors giving its maximum height at from twenty to forty feet. Mr. Britton then states that he has found trees, in the vicinity of Marquette on Lake Superior, that measured seventy feet in height; but he overlooks the detailed observations of Mr. Bell, who tells us that on the southern branches of Albany River, south-west of Hudson's Bay, he saw "large groves of these trees about seventy feet in height, and two feet in diameter at butt, with straight trunks nearly free from branches for the first twenty or thirty feet."

I have myself seen Banks's pine growing in abundance at various places along the lower River and Gulf of St. Lawrence, and at Newfoundland; and have found many trees at Godbout and Seven Islands that were upwards of fifty feet in height, and some that exceeded sixty feet. In the Province of Quebec it is largely used as a fire-wood, and along the north shore of the river it has become an article of commerce of no inconsiderable value, thousands of cords being shipped annually to Quebec. It is here called "cypress"!

In our manuals the species is commonly, though very improperly termed the "northern scrub pine." Its habitat is in the far north, where it attains its maximum development, constituting one of the larger forest trees. Only beyond the limits of its proper range does it occur as a "straggling shrub," or merit the appellation of "scrubby."

Mr. J. A. Allen, in treating of the correlation of size with geographical distribution in mammals, has tersely formulated the following law, which is as strikingly applicable in the present case as in any member of the group for which it was particularly framed: "*The maximum physical development of the individual is attained where the conditions of environment are most favorable to the life of the species.* Species being primarily limited in their distribution by climatic conditions, their representatives living at or near either of their respective latitudinal boundaries are more or less unfavorably affected by the influences that finally limit the range of the species."

Locust Grove, N. Y. C. HART MERRIAM.

Lonicera grata.—Does any New York or New Jersey botanist know aught of the station for this plant, "in the cedar swamps of New Durham, about three miles from Hoboken, New Jersey," cited by Torrey in his Flora of the Northern and Middle States, or, if the plant and the swamp are now extinct, is any other locality known? There is no specimen from New Jersey or New York in the Torrey Herbarium. This herbarium has a specimen from Dr. Darlington, and his stations, as given in the second edition of the Flora Cestrica (it is not in the first edition), are "on Ridley Creek, by Mr. George W. Hall, in 1831, also along the Brandywine, above the Forks, in 1835, by John Rutter." Now there is nothing in the character, nor in Darlington's specimens, to distinguish the species from the *L. Caprifolium* excepting that the leaves are perhaps more glaucous beneath and that the flowers are said to "have almost too strong an odor to be agreeable." I am not aware that this has ever been said of the

European honeysuckle. Dr. Hale's Louisiana specimen, in Herb. Torr., I must suppose to be the European species. No other specimens purporting to be indigenous are known to me. Is there really an indigenous species of this sort? As Darlington cites *Lonicera Virginiana*, Marshall, Arbust., as a synonym of *L. grata*, and as Marshall, who lived in Darlington's district, assigns no particular habitat for his species, one may suppose that he had in view a wild species of his own region. But if so he would hardly have named it *L. Virginiana*; and his description answers rather to *L. sempervirens*, the flowers "having long scarlet tubes with short borders." We get no more satisfaction by referring to the original sources of the species. It was founded, in the Hortus Kewensis, on *Periclymenum Americanum* of Miller's Dictionary. Miller merely says it is from America. Pursh would seem to have known all about it. He says: "On the mountains, rambling among rocks, in shady, moist situations, New York to Carolina; rare." But in such matters Pursh is not to be trusted. Can any American botanist throw further light upon the matter?

ASA GRAY.

Magnolia glauca, L., on Long Island.—This tree, reported in the N. Y. State Flora as occurring on Long Island, and which has hitherto eluded the search of recent explorers, including the authors of the Catalogue of the Plants of Suffolk Co., has been found by Mr. Robert W. Newbery, of this city, growing spontaneously on both sides of the L. I. Railroad culvert at Tuttle's Pond, a short distance east of Speonk Station, Suffolk Co.

Brooklyn, N. Y. W. H. RUDKIN.

Botanical Notes.

Diospyros Kaki.—According to J. Ishikana, in a paper on the materials containing tannin used in Japan, a remarkable liquid, called "kaki-no-shibu," prepared from the astringent fruits of the persimmon (*Diospyros Kaki*), is used for giving strength and durability to paper, which is applied to many more uses in Japan than in other countries. This property appears to be due to the deposit from the film of liquid, with which the paper is covered, possessing somewhat of the character of lacquer, while the tannin acts as an antiseptic. The film formed by this liquid on materials coated with or immersed in it is almost insoluble in water or alcohol and is not perceptibly attacked by boiling with dilute sulphuric acid. The kaki-no-shibu is prepared from the fruits gathered early in the summer and beaten in stone mortars. The mass, transferred to wooden tubs, is covered with water for half a day, and then filtered through a straw bag. The liquid so prepared is a milky fluid of a light or dark grey color and evidently holds minute particles of solid matter in suspension.

The Development of Chlorophyll.—In recent works published by Messrs. Schimper and A. Meyer on the development of chlorophyll and color-bearing granules of plants, it is stated that instead of these bodies being formed free in the protoplasm of the cell, as hitherto

supposed, they arise from distinct structures or "plastidia" present in the young cell from its earliest existence, and that any pigment, starch grains, etc., found in connection with the structure named arise by later changes produced by continuous growth and division of the few minute plastidia foun in the young cells. Those which are deeply seated and not as yet colored are called by Schimper "leucoplastidia"; those which are nearer the light and in which a green coloring matter is developed, "chloroplastidia;" and those which in dividing give rise to needle- or spindle-shaped bodies or triangular ones with sharply pointed corners, and pass through various shades from green to carmine-red, he calls "chromoplastidia." These forms appear to be due to the crystallization of certain of the proteid contents of the plastidia. All the plastidia of the stem and leaves appear to rise by division of the plastidia in the *punctum vegetationis* of the young stem, and those of the root from the division and differentiation of those of the *punctum vegetationis* of the radicle. As they are found at a very early age of the embryo, even when only eight cells old, as in *Linum Austriacum*, Schimper thinks it probable that they arise from primitive plastidia in the oosphere. Starch grains may arise from the leucoplastidia, also, at a very early stage, as they may be observed in the oosphere. The Characeæ would seem to be the earliest plants in which all three forms of these bodies occur, the apical cells containing leucoplastidia, and the antheridia owing their color to chromoplastidia.

Botanical Literature.

Sylloge Fungorum omnium hucusque cognitorum. By P. A. Saccardo.

The second volume of this work is now issued. It contains 813 pages, besides 69 pages of Addenda, carrying the number of species up to 6,180, which is supposed to include all the Pyrenomycetes thus far known. At the end this volume there is an alphabetical index of all the specific names in the two volumes; the generic name being added in parenthesis after each specific name.

Whatever may be thought of the many new genera into which the old genus *Sphæria* is here divided, there can be but one opinion as to the practical value of the work, which should be in the hands of every thorough student of mycology. Vol. iii., describing the "imperfect" fungi, will appear next year.—J. B. E.

Contributions to American Botany. XI. By Sereno Watson. 8vo, pp. 100. (From the *Proceedings* of Amer. Acad. of Arts and Sciences. Vol. xviii).

This instalment of Mr. Watson's Contributions to American Botany, issued on the 15th inst., contains: (1) List of Plants from South-western Texas and Northern Mexico, collected chiefly by Dr. E. Palmer in 1879–80; Gamopetatalæ to Acotyledones; and (2) Descriptions of some new Western species (*Greggia linearifolia, Sagina crassicaulis, Montia Howellii, Astragalus Matthewsii, A. Wingatanus, A. hypoxylus, Spiræa occidentalis, Ribes ambiguum, Sedum radiatum, Gayophytum pumilum, Eryngium discolor, Suæda minutiflora, Eriogonum Shockleyi, E. Havardi, Euphorbia Plummeræ, Microstylis purpurea, M. corymbosa, Allium Plummeræ* and *Bouteloua Texana.*)

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, September, 1883. [No. 9.

New Species of Fungi.

By J. B. Ellis and Benjamin M. Everhart.

Haplaria chlorina.—Forming thin, greenish-yellow patches, .5–1$^{cm.}$ in diameter, hyphæ erect cæspitose, 3–4 together, brownish under the microscope, slender, 4–5-septate, tips minutely roughened and bearing numerous subglobse or slightly elliptical, 1.5–2x1–1.5μ hyaline conidia.

On rotten wood of *Magnolia*, Newfield, N. J. July, 1883.

Virgaria olivacea.—Hyphæ erect, simple, olive-brown, faintly septate below, slightly enlarged and paler, with a wavy outline, above, 125x2.5μ; conidia solitary, obovate, brown, terminal, 4x3.5μ. Forming an olive-brown, velvet-like coating extending for 1–3$^{cm.}$ along the surface of a dry dead oak-limb.

Newfield, N. J., Aug. 1883.

Differs from *V. globigera*, S. & E., in its olivaceous color and smaller conidia, without any granular contents.

Spicaria fumosa.— Hyphæ erect, solitary, smoky-brown, obscurely septate and mostly swollen at intervals, attached by a small, disk-like expansion at base, 70–80x3μ, subverticillately divided above into 2–5, short (7–8μ) hyaline branches, swollen at base and bearing at their tips a series of oblong, hyaline, continuous, 2.5–.75μ conidia, placed end to end so as to form a continuous chain or necklace, 20–40μ long and appearing, when examined in the dry state, as a faintly septate continuation of the terminal branches of the hyphæ, but quickly separating into its component conidia on the application of water.

On the spines of old chestnut-burs. Fairmount Park, Philadelphia, Pa. July, 1883. Hugo Bilgram.

Septoria flagellaris.—On orbicular, reddish-brown spots (1–2$^{mm.}$), definitely limited and often concentrically wrinkled, sometimes whitening out on the upper surface, apparently by the peeling off of the cuticle; perithecia either solitary in the centre of the spots or 2–3 together, sublenticular, 80–120μ in diameter; spores 35–114x 1.5μ, nucleate, or oftener 4–8-septate, broader at one end and gradually attenuated to the other.

On living leaves of *Calystegia Sepium*. Newfield, N. J., Aug. 1883.

S. Convolvuli, Desm., has spores only 35–50μ long, and larger perithecia on less definitely limited spots. *S. Sepium*, Desm., also differs in its spores being twice as broad, and in the different appearance of the spots.

Phyllosticta sphæropsoidea.—Spots reddish brown, with a light yellow border, varying in size and shape, 1–2$^{cm.}$, or, by confluence, larger; perithecia scattered, punctiform, immersed, opening above, but also projecting on the lower surface of the leaf, though

covered by the cuticle; spores globose or short elliptical, hyaline, filled with small nuclei, or with one or two large nuclei and many small ones, 12–15.5 x 8–10μ, on stout basidia like a *Sphæropsis*.

On living leaves of *Æsculus Hippocastani*. Vineland, N. J., August, 1883. Dr. E. C. Bidwell.

This appears to be quite injurious, many of the trees appearing at a little distance as if they had had their leaves scorched by fire.

PEZIZA (SARCOSCYPHA) CHLAMYDOSPORA.—Cæspitose, 1–2$^{cm.}$ across, sessile, dark brown, minutely granular outside, margin obsoletely toothed, involute when dry ; asci cylindrical, 170–200x10–11μ; paraphyses linear, stout, scarcely thickened above; sporidia uniseriate, elliptical, with a rough epispore, 1–2-nucleate, 11–12x7μ.

On the ground, West Chester, Pa., June, 1882–3,

Everhart, Haines, Jefferies and Gray.

Allied to *P. badia*, Pers., but differing in its rougher sporidia and the very large cells of the intermediate layer of the cups.

HELOTIUM SULFURELLUM.—Light lemon-colored or very nearly sulphur-colored with a slight tinge of green, farinose; stem firm, brownish at the base, gradually enlarged above, 3–7$^{mm.}$ high; disk darker, pale cinnamon-brown when dry, concave or nearly plane, sometimes distinctly umbilicate, 2–4$^{mm.}$ broad, margin subacute and even; asci cylindrical, 75x7–8μ; paraphyses filiform, slightly enlarged and yellowish above; sporidia uniseriate, partly overlapping, navicular, elliptical, 2-nucleate, nearly hyaline or with a faint tinge of yellow, 10–12x3.5–5μ.

On fallen petioles of *Fraxinus Americana*.

West Chester, Pa., August, 1883. Everhart and Haines.

Helotium Limonium, C. & P., and *H. gracile*, C. & P., which this somewhat resembles, have quite different sporidia.

DIAPORTHE ASCLEPIADIS.—Stroma forming black patches on the surface of the stem, .5$^{cm.}$ long, or, by confluence, much longer, limited within by a deeply penetrating, black, circumscribing line; perithecia scattered globose (.25$^{mm.}$), buried in the substance of the stem, but not deeply; ostiola rather stout, cylindrical, subobtuse, .25–.33$^{mm.}$ long; asci (spore-bearing part) 35–40x9μ; sporidia biseriate, elliptical, constricted in the middle, 3–4-nucleate, subobtuse, 10–12x 3–4μ.

On dead stems of *Asclepias tuberosa*. Newfield, N. J.

GNOMONIA SASSAFRAS. — Perithecia erumpent, hemispherical, about 200μ in diameter, scattered over the lower surface of the leaves and along the midrib; ostiola filiform, 200–250μ long, of fibrous texture, subhylaline above, mostly a little bent; asci lanceolate, curved; paraphyses none; sporidia spiculiform or filiform, with a faint yellowish tinge, indistinctly multinucleate, 35–40x.75μ.

On fallen leaves of *Sassafras officinale*.

Fairfield Co., Ohio, June, 1883. W. A. Kellermann.

SPHÆRELLA SASSAFRAS. — Perithecia minute, semi-immersed, scattered over the lower surface of the leaf, or collected in groups, but not on any discolored spots; asci 35x5μ; sporidia biseriate, oblong-elliptical, uniseptate, 4x1.75μ, hyaline.

With the preceding.

On the Fruit of Eustichium Norvegicum, Br. Eu.

By Elizabeth G. Knight.

The rare moss, *Eustichium Norvegicum*, has long been known to bryologists, but, up to the present time, no description of its fruit has been published. It has been my good fortune to find the plant in fructification, and a description of the fruit, illustrated by figures showing the details of its structure, is here appended.

The moss was found in great abundance on the Potsdam sandstone in the dells of the Wisconsin River, near Kilbourn City, Wis., on July 8th of the present year, and, after careful search, seventeen fertile specimens were obtained. It grew on moist, vertical faces of rock forming large patches.

Description of the Fruit.—Capsule terminal, pendent, pyriform, $1^{mm.}$ long and about half as broad when moist, noticeable by its yellow color, supported on a curved pedicel which slightly exceeds the length of the capsule; teeth none in the specimens collected, their place being occupied by a thin, transparent membrane; columella a straight rod persistently attached to the operculum; operculum long-rostrate, conic when moist, flattening in drying by the contraction of the elastic annulus, leaving the oblique rostrum prominently projecting, itself parting from the expanding mouth of the capsule and carrying with it shreds of the ruptured membrane; calyptra cuculliform, $.75^{mm.}$ in length, tipped with a long whip-like awn, which equals or exceeds in length the rest of the calyptra.

The other characters agree with the description given in Sullivant's Mosses in Gray's Manual (4th ed., 1863, p. 629), as follows:

"Stems frond-like, flat, mostly simple (about 1′ long and 1″ broad), rooting only at the bulb-like base; leaves 2-ranked, complicate, closely imbricating, erect; those on the middle of the stem elongated-oblong, obliquely truncate, shortly acuminate, increasing in size as they ascend, the perichætial leaves attenuated into a long and linear, flexuous, pellucid, flat, equitant and slightly serrulate point, longer than the lamina; areolation above sub-rotund, below oblong, that of the point of the perichætial leaves linear; costa percurrent, its upper part narrowly winged; dicœcious; flowers of both kinds terminal."

In the Memoirs of the American Academy (n. ser., p. 57. t. i.) Sullivant says: "The genus of our moss must remain uncertain until the discovery of its fruit, which we may now expect," etc. If further examination of more mature specimens proves the lack of teeth, then the South American *Eustichia longirostris*, Brid., should be transferred to another genus. For description of *E. longirostris*, see G. Mitten, *Jour. Linn. Soc.*, xii., p. 603 and Brid. Bry. Univ. For descriptions of *Eustichium Norvegicum*, see Br. Eu., fas. xlii.; Brid., Vol. ii., p. 674; and C. Müller, Syn. Musc. Frond, i., p. 42.

Explanation of the Figures.—Fig. 1. Calyptra magnified 50 diameters. Fig. 2. The fresh capsule, with conical operculum, magnified 50 diameters. Fig. 3. The same dried, with detached and contracted operculum. Fig. 4. Calyptra and columella seen through a natural rupture in the wall of the capsule. Fig. 5. Another view of the same. Fig. 6. An entire plant magnified 5 diameters.

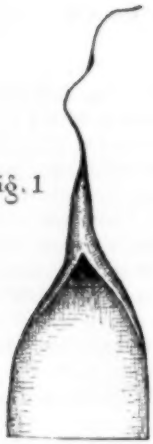


Fig. 1

Fig. 2

Fig. 3

Fig 4

Fig. 6

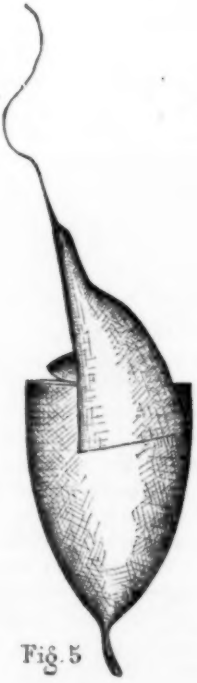


Fig. 5

A New Eleocharis.

By CHARLES WRIGHT.

ELEOCHARIS DIANDRA.—Culms nearly terete (8′–10′ high) from tufted, fibrous roots, rather slender; spike ovoid, very obtuse (2″–4″ long); scales numerous (80–120) ovate, rounded at the tip, one-third longer than the achenium, imbricated in many rows; stamens two; achenium cuneate-obovate, pale stramineous becoming castaneous, shining, scarcely half a line long; bristles few and short, or mostly wanting; tubercle depressed, tranversely oblong, the ends rounded and slightly elevated, the top shortly apiculate; style usually bifid.

On high sand-bars of the Connecticut River, between Hartford and Wethersfield, growing in company with *E. obtusa*, which it closely resembles in appearance. A tabular statement of the differences is appended.

	Eleocharis obtusa, Shultes.	*Eleocharis diandra*, n. sp.
TUFTS mostly	larger, annual.	smaller, annual.
SPIKE	very blunt.	bluntish or acutish.
SCALES	rounded at top; one-third longer than the achenium.	narrowed towards the blunt apex; twice as long as the achenium.
STAMENS	three.	two.
BRISTLES	exceeding the tubercle.	few and short or mostly O.
ACHENIUM	larger, tapering evenly to the base.	smaller, tapering more abruptly into a narrower base.
TUBERCLE	crest-like and thin, curved on the lower edge, which rests its whole length on the achenium, and is almost as broad, the two other sides forming about a right angle.	transversely oblong, its end rounded and raised above the achenium, and little more than half as broad, shortly apiculate.
STYLE	3-cleft, rarely bifid.	bifid, rarely 3-cleft.

The main differences are: first, *two* stamens, for which in our floras there is no generic allowance; secondly, the usually bifid style; thirdly, the tubercle wanting the *cusps* which run down the top of the achenium of *E. obtusa*; and, fourthly, the few small bristles, or mostly none at all.

New or Little-known Ferns of the United States, No. 14.

By D. C. EATON.

53. *Phegopteris reptans*, (*Polypodium reptans*, SWZ.; *Aspidium reptans*, Mett.),—Rootstock short, creeping; stalks clustered, gray-stramineous, slender, naked, a few inches to a foot long; frond as long as the stalk, membranaceous, softly hairy with branched or stellate hairs, oblong lanceolate, pinnate with nearly or quite sessile oblong or sometimes rounded obtuse crenately pinnatifid pinnæ, the apex pinnatifid and often elongated and rooting; veins pinnate, simple, the basal veinlets often anastomosing; sori rather small, seated on the middle of the veinlets, naked or with a minute rudiment of an indusium.

Pendent on the face of cavernous calcareous rocks in a hammock on the left bank of the Withlacoochee River, 15 miles N. E. from Brookesville, Hernando Co., Florida; Captain John Donnell Smith, March 22, 1883.

This is another common West Indian fern, now known to inhabit Florida. Mettenius, who referred it to *Aspidium* on account of a barely perceptible rudiment of an indusium, recognized four varieties: *cordata*, *hastæfolia*, *radicans* and *asplenioides*. Captain Smith's specimens represent the first and third of these forms, which are often found on the same plant, and cannot properly be separated even as varieties.

54. *Adiantum tenerum*, Swz.—Fine specimens from the same station, a new locality.

55. *Asplenium firmum*, Kze.—The same station.

56. *Asplenium rhizophyllum*, Kze.—The same station. These fronds are over a foot long, and have much coarser segments than the plants heretofore separated under the name of *A. myriophyllum*. The intermediate forms now sent in by several collectors show that the latter can not be kept distinct, and that, with Mr. Davenport (Catalogue, Supplement, March, 1883, p. 46), we must be content with the older name for both.

57. *Aspidium trifoliatum*, Swz.—The same station. Several other well known Florida ferns are in Captain Smith's collection of the present year, and are represented by fine specimens, as usual.

Plants New to the Connecticut Flora.—Mr. Charles Wright, the veteran botanist, has found the following plants additional to the Berzelius catalogue :

Ludwigia polycarpa, Short & Peter.—Abundant in wet places in Hartford.

Crantzia lineata, Nutt.—Salt marshes at Fenwick, near the railway station.

Alopecurus geniculatus, L.—Common in wet places about Wethersfield.

Mrs. Emily J. Leonard, of Meriden, has noticed a few newly introduced plants :

Sarothamnus scoparius, Wimmer.—Near Meriden, some ten square rods of it by the roadside.

Phacelia Purshii, Buckley.—At Short Beach, Branford.

Phacelia viscida, Torrey.—Spontaneous with *Impatiens fulva* and other brook-plants, in a spot on which muck had been deposited.

To these I add :

Glycyrrhiza lepidota, Nutt.—Established and spreading on a roadside in New Haven.

Cycloloma platyphyllum, Moquin.—Hamden, Miss Edwards.

Chætomorpha melagonium, Kützing.—On rocks at low water mark on Black Point, East Lyme ; an alga not before noticed south of Cape Cod.

DANIEL C. EATON.

Contributions toward a List of the State and Local Floras of the United States

V. THE WESTERN STATES.

Synopsis of the Flora of the Western States. By J. L. Riddell, M.D. (B.)

8vo, pamphlet, pp. 116. Cincinnati, 1835; also in Western Journ. Med. and Phys. Sci., January and April, 1835.

Flora of the Lake Superior region. By W. D. Whitney. (B.)

In Foster and Whitney's Report, Part ii., Washington, 1851.

Notice of the Plants collected by Prof. D. B. Douglass, of West Point, in the expedition under Governor Cass during the summer of 1820, around the great lakes and upper waters of the Mississippi. By John Torrey, M.D. (C.)

In Sillimans Journal, i series, Vol. iv., 1822.

Catalogue of Plants collected by Mr. Charles Geyer, under the direction of I. N. Nicollet, during the exploration of the region between the Mississippi and the Missouri Rivers. By John Torrey, M.D. (C.)

Appendix B, Senate Doc. 237, 26th Congress, Washington, 1843.

(The list embraces plants collected in portions of Minnesota, Iowa, Nebraska and Dakota.)

Plants collected during the exploration of the Upper Missouri by F. V. Hayden. By George Englemann, M.D. (B.)

In Trans. Amer. Philos. Soc., Vol. xii., Philadelphia, 1863.

(The plants enumerated are mostly from Nebraska, with some from Iowa, Dakota and Montana.)

Notice concernig the late Mr. Drummond's Journeys and his collections made chiefly in the Southern and Western parts of the United States. By W. J. Hooker. (D.)

In Comp. to Bot. Mag., i., p. 39, et seq.

Systematic Catalogue of the Plants of Wisconsin and Minnesota, made in connexion with the Geological Survey of the North-west, during the season of 1848. By C. C. Parry, M.D. (C.)

In Rep. Geol. Surv. Wisconsin, Iowa and Minnesota by David Dale Owen, p. 606, Philadelphia, 1852.

(Includes localities for some Iowa Plants.)

The Grasses of Wisconsin and the adjacent States of Iowa, Illinois, Indiana, Ohio and Michigan, the Territory of Minnesota and the regions about Lake Superior (D.) By I. A. Lapham.

In some state publication of Wisconsin, the title of which we have been unable to ascertain.

OHIO.

Supplementary Catalogue of Ohio plants, embracing the species discovered within the State in 1835. By J. L. Riddell, M.D. (D.)

In Western Journ. Med. and Phys. Sci. Vol. ix. 1836.

List of the Medicinal Plants of Ohio (with brief accounts of their properties.) By J. M. Bigelow.

8vo, pp. 47. Columbus, 1849.

List of Grasses found in Ohio. By J. H. Klippart. (B.)

In Ohio Agricultural Report for 1859.

List of the native Forest Trees of Ohio. By J. H. Klippart. (A.)
In Ohio Agricultural Report for 1860.

Catalogue of the flowering Plants and Ferns of Ohio. By J. S. Newberry, M.D. (B.)
8vo, pamphlet, pp. 41. Columbus, 1860.

List of Forest Trees found growing indigenously in Ohio. By John Hussey. (B.)
In Ohio Agricultural Report for 1872, pp. 32–40.

Catalogue of the Plants of Ohio, including flowering Plants, Ferns, Mosses and Liverworts. By H. C. Beardslee, M.D. (B.)
8vo, pamphlet, pp. 19. Painesville, 1874; also in Ohio Agricultural Report for 1877.

List of Hepaticæ growing in Ohio. By H. C. Beardslee. (A.)
In Botanical Gazette, Vol. i., p. 22. 1876.

Woody Plants of Ohio. By John A. Warder, M.D., assisted by D. L. James and Jos. F. James. (D.) Presented at the meeting of the Agricultural Convention of Ohio in Columbus, January, 1882.
8vo, pamphlet, pp. 40.

Darke County.

Common forest Trees noticed in Darke County. By A. C. Lindemuth. (A.)
In Rep. Geol. Surv. Ohio, Vol. iii., p. 511. 1878.

Defiance County.

List of Trees of Defiance County. By N. H. Winchell. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 424. 1874.

Delaware County.

Trees, Shrubs and woody Vines found growing in Delaware County. By Rev. J. H. Creighton. (A.)
In Rep. Geol. Surv. Ohio, Vol. ii., p. 274. 1874.

Fairfield County.

Florula Lancastriensis, or a Catalogue comprising nearly all the flowering and filicoid Plants growing naturally within the limits of Fairfield County, with notes of such as are of medicinal value. By John M. Bigelow, M.D. (A.)
In Proc. Med. Convent. of Ohio at Columbus, May, 1841. Columbus, 1841.

Florula Lancastriensis; a Catalogue of the Plants of Fairfield County. By John M. Bigelow and Asa Hor. (A.)
8vo, pp. 22, Lancaster, 1841.

Franklin County.

Catalogue of the Plants growing spontaneously in Franklin County, Central Ohio. By John L. Riddell, M.D. (A.)
In Western Med. Gaz., Vol. ii., 1834.

Catalogue of the Plants, native or naturalized, in the vicinity of Columbus. By W. S. Sullivant. (A.)
8vo, pamphlet, pp 63. Culumbus, 1840.

Hamilton County.

Catalogue of the Plants of Cincinnati. By Thomas G. Lea. (C.)
8vo, pp. 77. Philadelphia, 1849.

Catalogue of the flowering Plants and Ferns observed in the vicinity of Cincinnati. By Joseph Clark. (A.)
16mo, pamphlet, pp. 40. Cincinnati, 1852.

Catalogue of the flowering Plants, Ferns and Fungi growing in the vicinity of Cincinnati. By Joseph F. James. (A.)

In Jour. Cincin. Soc. Nat. Hist., Vol. ii., 1878. (Additions and corrections by Davis L. James. (B.) Vol. iv., 1881.

Henry County.

List of Trees characteristic of Henry County. By N. H. Winchell. (A.)

In Rep. Geol. Surv. Ohio, Vol. ii., p. 416. 1874.

Miami, Montgomery, Butler, Warren and Hamilton Counties.

Flora of the Miami Valley. By A. P. Morgan. (A.)

Published by the Literary Union, Dayton, Ohio.

16mo, pamphlet, pp. 68. Dayton, 1878.

(List includes Phænogams, Ferns, Mosses, Liverworts, Lichens and Fungi.)

W. R. G.
N. L. B.

Notes on a Botanical Excursion to Sam's Point, Ulster Co., N. Y. —Sam's Point is a rocky promontory of the Shawangunk Mountains, about five miles east of Ellenville, New York, overlooking the Wallkill Valley between the Shawangunk and Highland ranges, at a height, as marked on a ledge at its summit, of 2,340 feet above the sea. This promontory is composed of a very close conglomerate rock, made up of white quartz pebbles, nearly horizontally bedded, the top being a flat table-land. Geologically, this rock is known as the Shawangunk Grit, the equivalent of the Oneida Conglomerate of the Upper Silurian strata. Thinly bedded, Lower Silurian shales of the Hudson River Group, underlie this conglomerate rock, forming the base of the hill on which it rests.

The woods surrounding this table-land are made up of the pitch pine, with some few common deciduous trees, and an occasional white pine and hemlock. The undergrowth of these woods consists of *Quercus ilicifolia*, Wang., *Nemopanthes Canadensis*, D. C., *Sambucus pubens*, Michx., *Rhodora Canadensis*, L., *Viburnum pubescens*, Pursh, *V. nudum*, L., *Cornus circinata*, L'Her., and *C. sericea*, L., *Acer spicatum*, Lam., and *A. Pennsylvanicum*, L., *Aralia hispida*, Michx., *Viburnum lantanoides*, Michx., and great quantities of *Gaylussacia resinosa*, T. & G., and of *Vaccinium Pennsylvanicum*, Lam.

My visit was made in the latter part of August when little else than Compositæ was in bloom. Besides the commoner plants of this order, *Solidago squarrosa*, Muhl., and *S. latifolia*, L., were plenty. A few specimens of *Gentiana quinqueflora*, Lam., were found towards the base of the hill. *Spiranthes gracilis*, Bigelow, grows abundantly among the bushes, both on the table-land and at its base, often with but a single tuber, instead of "roots clustered" as in its specific description. Two specimens of *Botrychium lanceolatum*, Angst., were found in woods near the Point.

The flora of the top of this elevated ridge is characterized by an abundant growth of *Pinus rigida*, Miller, very much stunted in growth, fruiting indeed at two feet from the ground and forming low, straggling bushes, few of them more than five feet high, the leaves

also shortened to half the length of those borne by ordinary trees of this species. *Arenaria Grœnlandica*, Spreng., grows on all the exposed rocky ledges, and *Clintonia borealis*, Raf., in a sphagnous swamp and also in the woods at the base of the hill. The shrubs mentioned above are also found on the summit.

A broad, shallow pond, a mile or so north-east of the Point, on the table-land, well repaid exploration. Here the small form of the white water-lily, (*Nymphœa odorata*, Ait,, var. *minor*, Sims) grows plentifully. *Eriocaulon septangulare*, With., *Lobelia Dortmanna*, L., and *Isoetes echinospora*, Durieu, var. *Braunii*, Engl., were found in shallow water near the shore, and *Drosera rotundifolia*, L., with *D. intermedia*, Hayne, var. *Americana*, D. C., in fine condition in the *Sphagnum* along the margin.

N. L. Britton.

Arthrocladia villosa, Duby.—This beautiful species, which is nowhere very abundant, has been considered especially rare in America. A specimen found many years ago gave it a place in the Nereis Boreali Americana of Dr. Harvey. It was not reported again until a single specimen was found by Mr. Collins a few years since at Falmouth Heights, Mass. In 1881 I found another solitary specimen near the same place at Menanhant, a summer settlement in Falmouth. In 1882 I looked in vain for it all summer long, but a single plant was found that year by Mrs. Chambrè. But the latter part of July this season, after a severe south-west wind which lasted several days, this rare plant was washed up quite abundantly. I secured and mounted over eighty specimens, and might have collected many more. Some of these are about fifteen inches in length and several are complete, having the holdfast. It seems probable that it grows in the deep water in the narrow part of Vineyard Sound, and is torn up only when there is an unusual disburbance of the water.

Springfield, Mass.

George W. Perry.

Notes from N. Lower California.—On a recent trip into the mountains of Lower California, my father, H. C. Orcutt, and myself found *Quercus Palmeri*, *pungens* and *Emoryi* abundant at an elevation of 4,000 to 6,000 feet, and as far south as San Rafael Valley, near where we found *Pholisma arenarium*, Nutt., on the roots of *Q. Palmeri*. From north of the boundary, and south over a hundred miles by road, we found *Adenostoma fasciculatum* and *sparsifolium* still abundant, and, with them, *Arctostaphylos pungens* and *Garrya flavescens*, var. *Palmeri*, Watson. The latter we found from 2 to 10 feet high. In general appearance of leaves and stalk (although the bark does not exfoliate, and is grayish) it closely resembles the manzanitas, and we found it to have a similar large root, which only differed from that of our *Arctostaphylos* in being black instead of reddish colored. Among the graceful piñons (*Pinus Parryana*), we found the "sotole" (*Nolina Palmeri*) abundant and presenting the appearance of coarse grass growing near water, but in reality growing in the

dryest places. Its root is used by the Spaniards as a substitute for soap in washing their garments. Among the rocks on dry hills, to the south of the piñons, we detected *Agave Pringlei*, Engelm. (ined.), in bloom July 28, 1883, and found the fibre of its long and slender leaves to be preferred by the Indians, for making ropes and other articles, to that of the more abundant *A. deserti*. The root, leaves and flower-stalk of both species are, after being roasted, eaten by the Indians, who also asserted that they ate the golden lichen, *Evernia vulpina*, which grows in small quantities, especially on dead manzanitas, among these mountains.

Among the large pines or piñons (*Pinus Jeffreyi?*), to the south of the piñons, we found the pretty *Ivesia Baileyi*, Watson, in the crevices of the granite boulders that form the immense rocky ridges through this district; and, at the base of these rocks, were many pretty plants, among them the familiar *Aquilegia truncata* and *Pteris aquilina*, and also *Geranium cæspitosum*, *Arenaria alsinoides*, Willd., *Eriogonum Parishii*, *Galium pubens* and *angustifolium*, etc., and on the grassy plains or meadows, between the stretches of pine forest, were *Verbena littoralis*, HBK., *Cnicus Drummondii*, var. *acaulescens*, *Eriogonum foliolosum*, Wats., *n. sp.*, and a variety of *Horkelia Californica*. On little pools or lagoons we found *Potamogeton natans*, L., and *Polygonum Hartwrightii*, Gray.

San Diego, Cal. C. R. ORCUTT.

Autumn Foliage.—A comparison of notes on the local condition of foliage, made on October 5th, with similar notes of October 1st, 1882, shows an interesting difference. This is so marked in many cases that it is worthy of note, especially since the opinion has gained some ground among botanists that the appearance and fall of the leaves occur at nearly the same dates each year. From my notes it appears that the season, as regards foliage, is at least ten days later this year than last. A few species, the black and red cherries, the apple, pear, peach and plum are at about the same stage. The difference appears slightly in the golden willow, sugar-maple and silky cornel; to a marked degree in the ash, chestnut, shagbark, American and slippery elms, all the oaks (eight species), and the fox-grape, while it is very decided in the flowering dogwood, beech and pignut. The three last were perfectly fresh and green on the above date, while my notes for 1882 describe them as largely brown and dead at that time.

Of course the explanation of this difference is to be found in meteorological conditions, which I am able to give for both years as follows:

	AUGUST.			SEPTEMBER.		
	Temp.	Rel. Humidity.	Rain.	Temp.	Rel. Humidity.	Rain.
1882....	67.3°	66.1	0.99	63.7°	77.2	16.56
1883....	66.3°	69.2	2.91	59.9°	71.0	2.27

The ash and sugar-maple have borne an unusual abundance of fruit this season throughout all this region (Orange County, N. Y.) Has anyone noticed a similar fertility elsewhere?

Mountainville, N. Y. W. E. STONE.

Botanical Notes.

Motion of Stamens in Centaurea.—At a recent meeting of the Philadelphia Academy of Natural Sciences, Mr. Meehan called attention to fresh specimens of the flowers of *Centaurea Americana*, a native of Texas, which had been sent to him from Newport, accompanied by a letter from Miss Mary Powell, in which she describes a peculiar motion of the stamens. After describing and illustrating the structure of the flower in detail, the speaker remarked that if the point of the united stamens be touched, the pollen will begin to overflow and the pistil appear above the mass. If the pistil be now touched, the entire floret bends from side to side or makes a circular motion. Sometimes the motion will be communicated to other florets, which may bend in different directions. The *Centaurea* is closely allied to the thistles, and Mr. Meehan had found in all the species of the latter which he had examined the same kind of motion, although in our common field thistle it is quite feeble.

The irritability of the anthers had been partially described by Sachs and other German botanists, although none of them alludes to a movement of the entire floret. They believe the movement to be due to contractility, but the speaker suggested that some other mechanism is probably involved, as the motion is only to be observed when the pollen is present. If the latter be all brushed off the motion ceases.

Proceedings of the Torrey Club.—The regular meeting of the Club was held at Columbia College, Tuesday evening, April 10th. In the absence of the presiding officers, Mr. B. F. Braman occupied the chair. There were twenty-six persons present.

Field Committee.—The chairman appointed Messrs. Day, Rudkin and Hollick a committee on field excursions for the current year.

The Rev. A. B. Hervey, on invitation of the chair, made some remarks on the study of algæ.

Four persons were elected active members.

At the regular meeting held Tuesday evening, May 8th, the President occupied the chair and twenty-one persons were present.

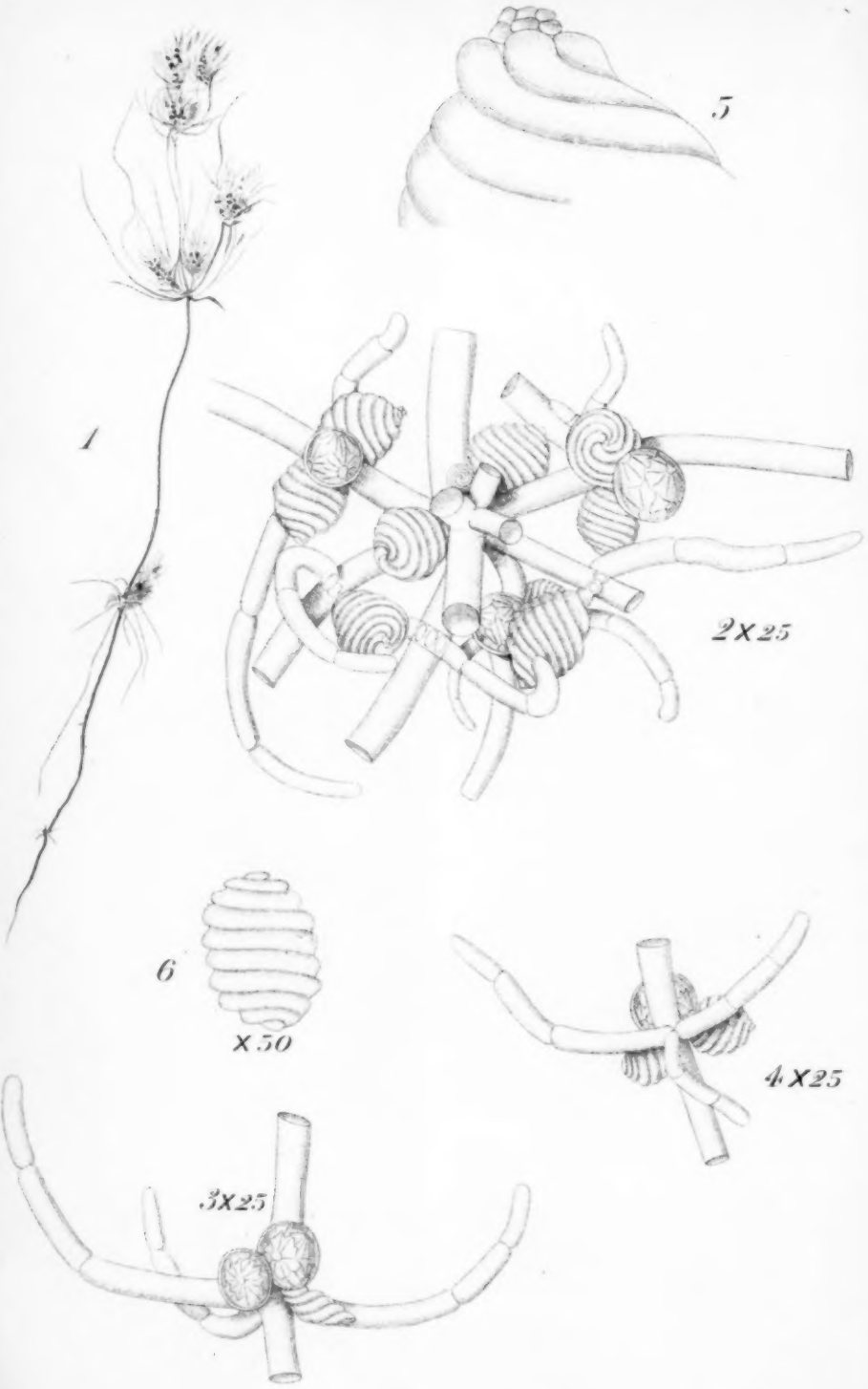
Mr. Braman exhibited specimens of *Pistia spathulata*, Mx., from Florida. The President remarked that fossil specimens of this genus were found in the cretaceous rocks of Wyoming.

Mr. Britton showed specimens *Veronica hederæfolia*, L., and *Lithospermum arvense*, L., from a new locality, Kingsbridge, N. Y.

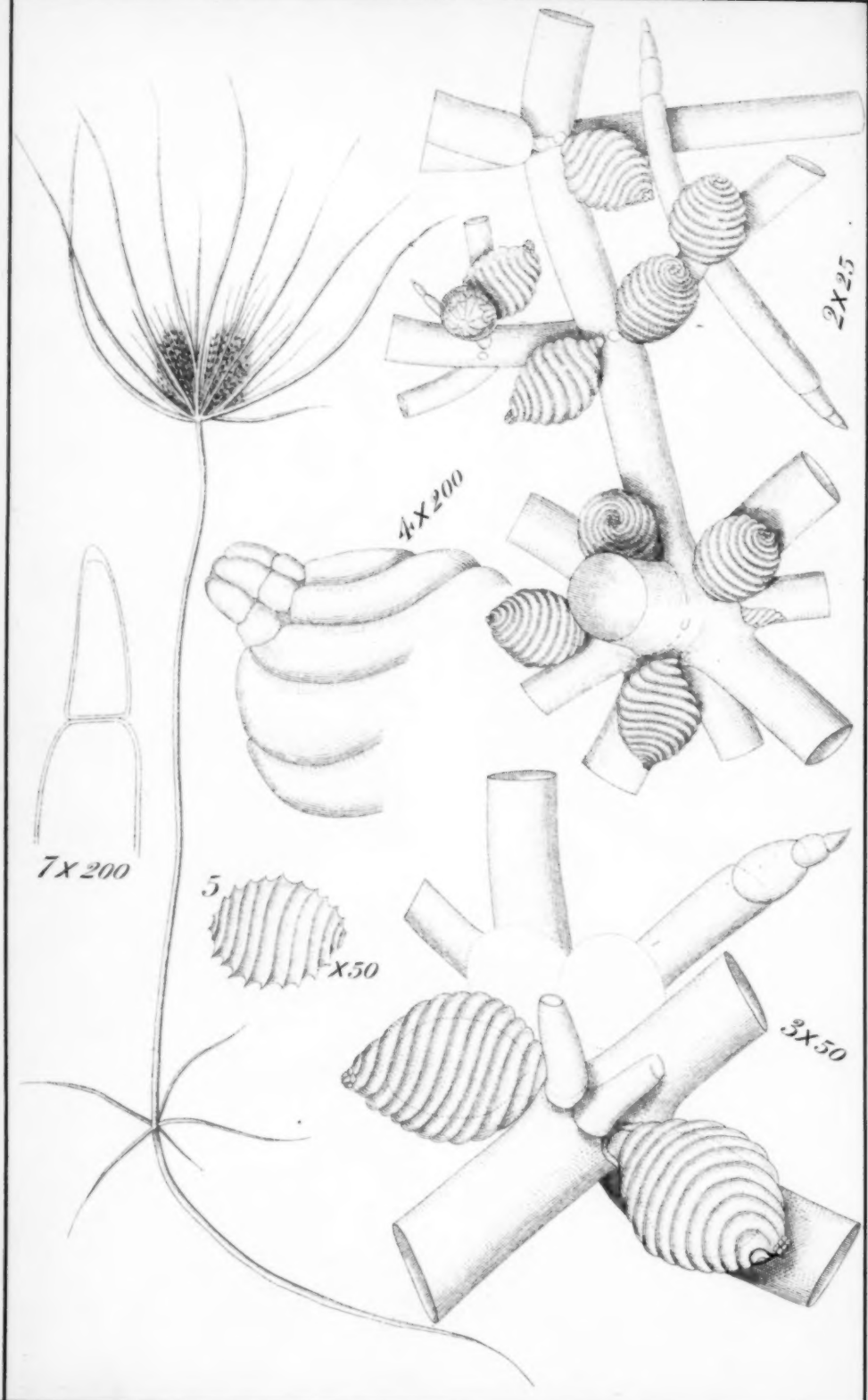
Mr. Bicknell showed specimens of *Carex Pennsylvanica*, Lam., and of *C. varia*, Muhl., which closely resembles it, and pointed out an important difference by which they may be distinguished, this being the presence in *C. Pensylvanica* of long, spreading rootstocks by means of which plants covering a considerable area are connected. In *C. varia* these are not to be found.

One person was elected an active member.

Tolypella glomerata, Leonh var. abbreviata, Allen.

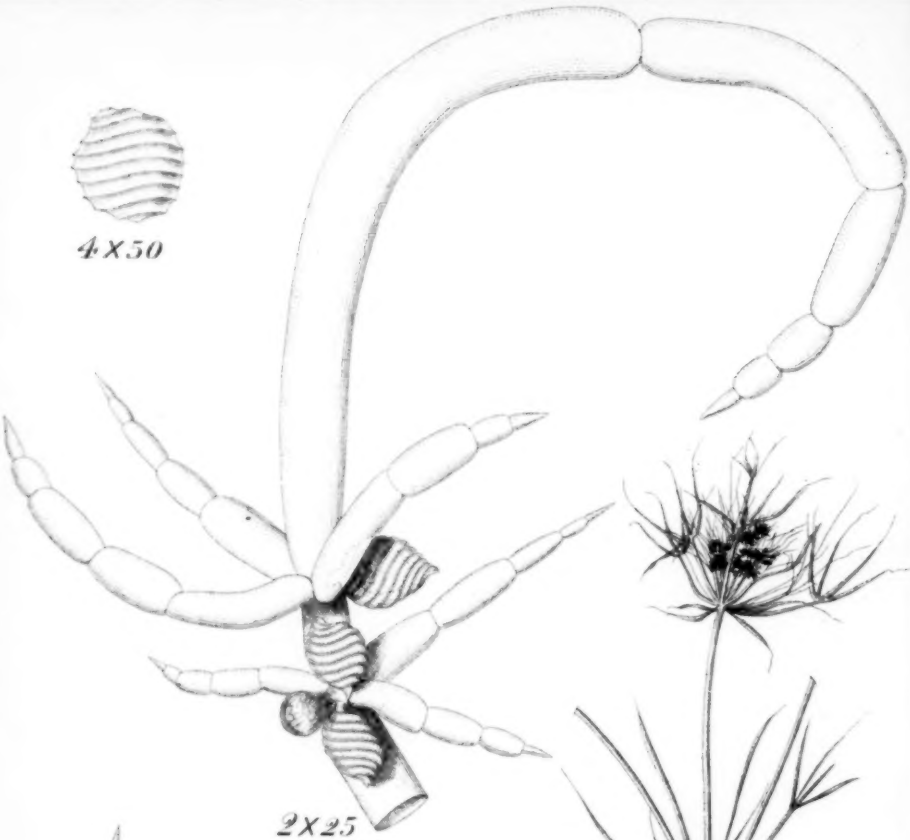


Tolypella comosa, Allen.



Tolypella fimbriata, Allen.

4X50



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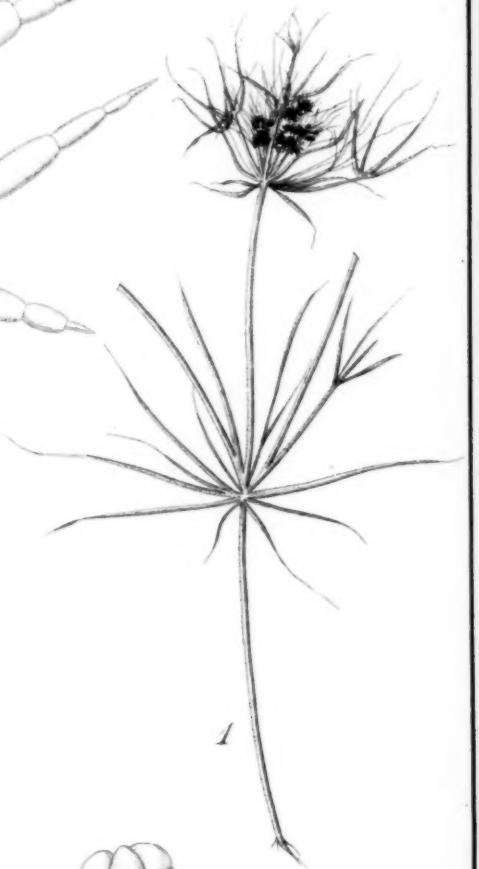

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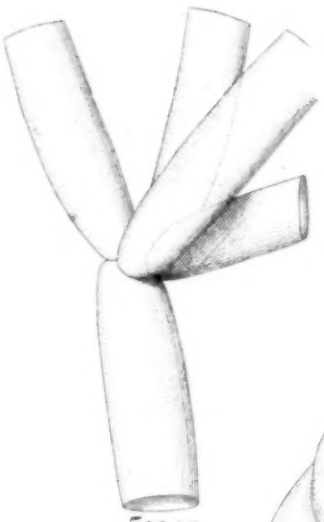
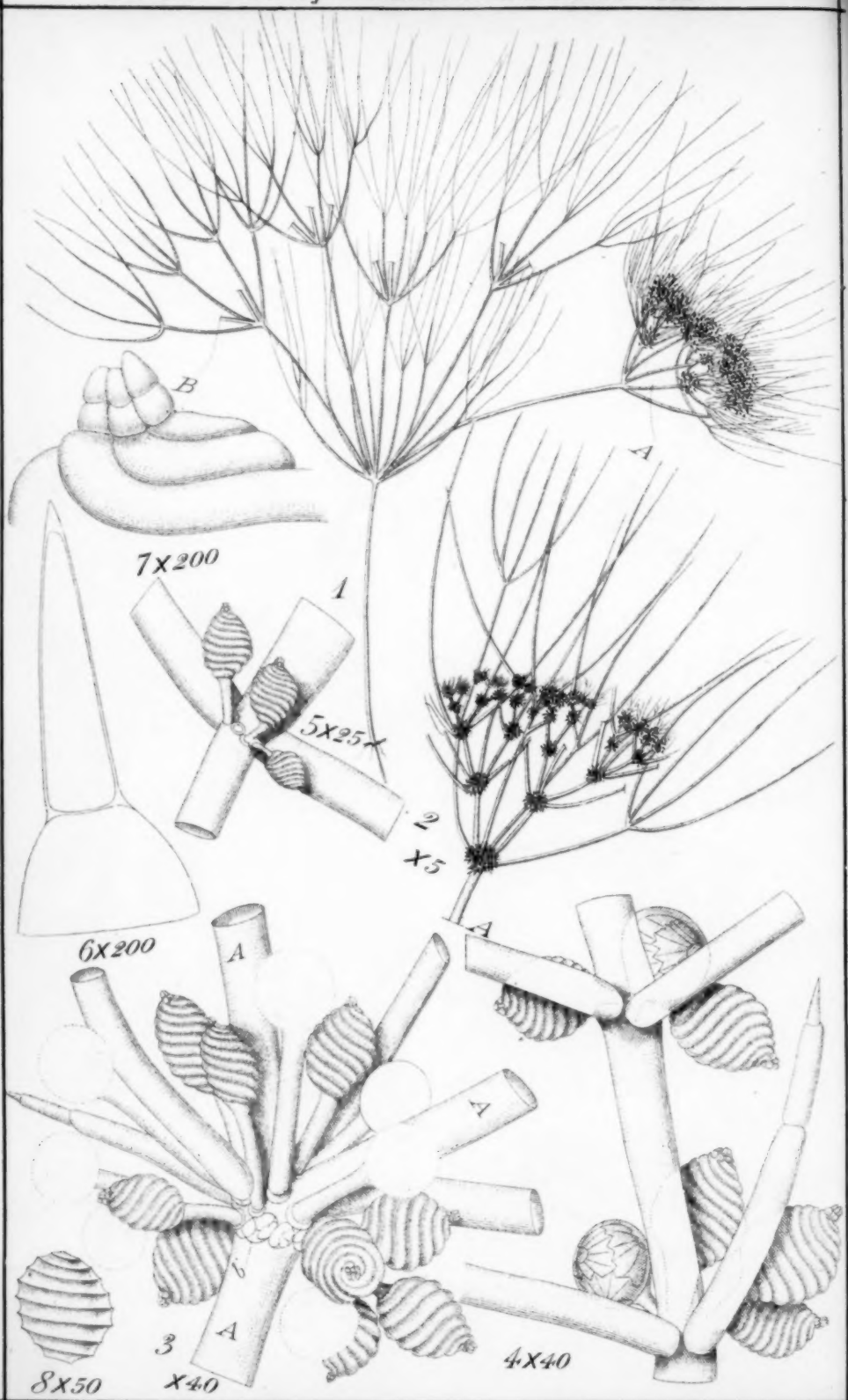
6X50



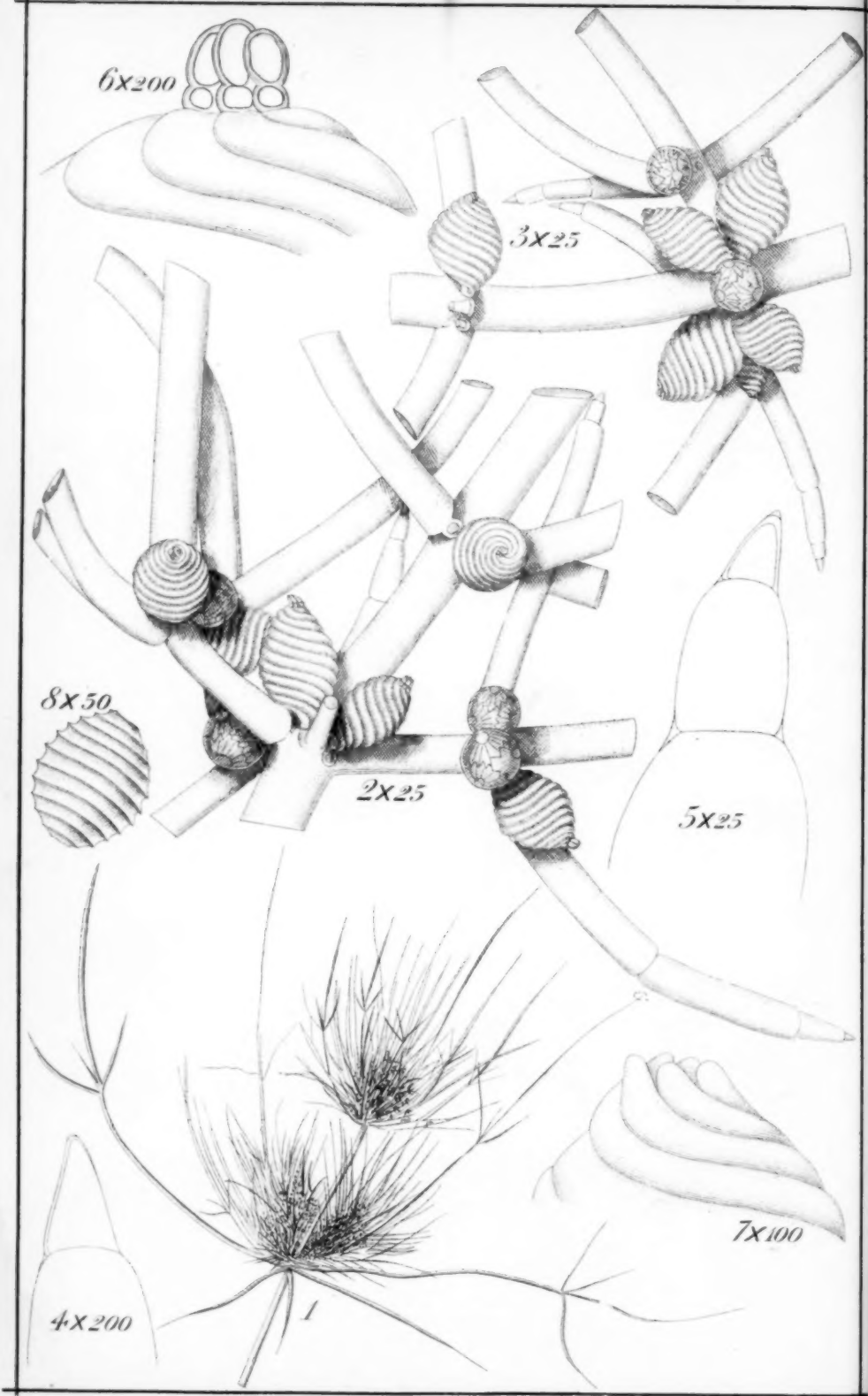
5X20

3X200

Tolypella Californica, A.Br.



Tolypella stipitata, Allen.



Tolypella intertexta, Allen.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, Oct. & Nov., 1883. [Nos. 10 & 11.

Notes on the American Species of Tolypella.

By T. F. Allen.

(Plates XXXVII.–XLII.)

In this paper some new species of the genus *Tolypella* will be described and an account given of those already known to inhabit America, which promises to yield an unusual number of these interesting plants.

The two families into which the Characeæ may be divided are characterized mainly by the structure of the coronula of the sporangium, this being formed by a division of the cells, which, like spiral tubes, envelop the nucleus. In the *Chareæ* a *single* septum in each tube, near its extremity, gives rise to a circle of *five* cells on the top of the sporangium. In the *Nitelleæ* two septa form, and a double series, of five cells each, produces a coronula of *ten* cells; this, in some species, is detached as the fruit matures (not increasing in size, *pari passu*, with the enveloping cells) and is *evanescent*, while in others it is *persistent*. The *Nitelleæ* consist of two genera mainly differentiated by the position of the *antheridium*, which in *Nitella* is *apical*, on the primary ray of the leaf, while the sporangia are lateral on the node below the antheridium. The leaves also possess but one leaf-bearing node, though they may divide repeatedly. In *Tolypella* (A. Br.) Leonh., the leaves have 1–3 nodes, bearing leaflets and many-celled terminals; the leaflets do not equal in size the primary ray, are many-celled and often themselves have nodes which bear leaflets. *Antheridia* are one or several, *lateral on the nodes of the leaf and leaflet*, and also at the fundus of the verticil within the leaves (when, like the sporangia, they seem to arise from the cells surrounding the base of the leaf [the basilar node] T. F. A.), mostly with an elongated stipe.* In most species, the leaf-node seems to possess six principal nodal cells which encircle the leaf, three of these giving rise to fruit, and three to leaflets. Sometimes we find four fruiting cells and two leaflets, and sometimes the reverse. In a few instances the nodal cells are sub-divided, and an increased number of fruits and leaves is found. This is now and then observed in *T. intertexta* in the sub-division of a nodal cell, so that double sporangia are produced, one above the other. At first sight this looks like a circle of four sporangia with a central antheridium. The fruiting cells are always on the ventral (looking inward toward the axis of the plant) aspect of leaf, and the leaflets are always dorsal. The antheridium seems to occupy

* Prof. Braun says: "Sporangia *surrounding* the antheridium in large numbers on the nodes of the leaf" etc. Numerous preparations of fresh specimens with careful staining of the protoplasm, and good sections of the nodes, have failed to show, in any American species, that the sporangia arise from cells "*surrounding*" the base of the antheridium.

the first or central, the sporangia the lateral cells. This rule seems also to be observed in the fundus of the verticil, in which we find the antheridium on the inner aspect of the basal node, while the sporangia are lateral or even external, and, in other cases, these basal cells produce adventitious leaflets instead of sporangia, carrying out the same plan found on the leaf-node. The coronula is persistent or evanescent.* The leaves which bear fruit become compacted into more or less dense heads (or "nests"), owing, apparently, to a diminished growth of stem and leaf; the verticils are approximate, often closely so, and the leaves are incurved, forming a tangled mass.

The following key has been arranged to include the species known at this time.

KEY TO THE SPECIES OF TOLYPELLA.

I. OBTUSIFOLIA.—*Coronula evanescent. Sterile leaves undivided.*

A. Ultimate cell of the primary ray of the leaf longer than the other cells. *T. longicoma*, A.Br.

B. Ultimate cell not longer.

† Leaflets attenuate.

2. Marine. Nucleus 370–500μ long. *T. nidifica*, Leonh. (Europe.)

3. Submarine. Nucleus 300–340μ long. *T. Normaniana*, Ndst. (Europe.)

‡ Leaflets not attenuate.

4. Saline. Nucleus 300–360μ long. *T. glomerata*, Leonh.

5. Fresh water. Nucleus 425–475μ long, maturing in fall. *T. comosa*, Allen.

II. ACUTIFOLIA.—*Coronula persistent.*†

A. *Indivisa.* Sterile leaves undivided.

6. Nucleus 350-375μ long, leiopyrena. *T. prolifera*, Leonh.

7. Nucleus 425–450μ long, oxygyra. *T. fimbriata*, Allen.

B. *Divisa.* Sterile leaves divided (usually into four terminal leaflets.)

† *Attenuata.* Leaflets attenuate.

§ Secondary ray undivided, sterile.

8. Nucleus 285–355μ, rays 4–7-celled. *T. Californica*, A.Br.

9. Nucleus 330–340μ, rays 3–4-celled. *T. stipitata*, Allen.

§§ Secondary rays divided, fertile.

10. Nucleus 360–425μ long. *T. intricata*, Leonh.

11. Nucleus 450–500μ long. *T. intertexta*, Allen.

†† *Non attenuata.*

12. Ultimate cell mucroniform; nucleus 480–500μ. *T. apiculata*, A.Br. (S.Am.)

T. longicoma, A.Br. (MS., 1855).—The following account of this species is taken from "Braun's Fragmente, by Nordstedt."

"*T. longicoma* is related to *T. nidifica* and *glomerata* from which it

* It seems persistent in all the species having acute leaves and evanescent in all the species with obtuse ones.

† In number 11 the coronula is *sub-persistent* only.

differs in its compact, tufted growth, thin, delicate stem and leaves, want of all incrustation and flexibility. The sterile leaves are simple and very long, the ultimate segment (in the fertile leaves likewise) *always elongated*, but little attenuated. The fertile heads are small, compact, long tufted. The first segment of the fertile leaf is extremely short, and here only are very short lateral rays, *which are quite wanting on the the innermost, smallest fertile verticils*, or are so dwarfed as to be indistinguishable. Since the delicate cell-membrane tears easily on preparing the plant, it is difficult to spread it out and examine it. It forms dark green, thick tufts a hand high. Stem not over 480μ thick; leaves in the sterile verticil 6, simple, apparently 3-celled, and about 40$^{mm.}$ long. I saw, however, only two cells, often only one. The first cell is 20–25$^{mm.}$ long, 30–38μ thick, also the second cell seemed very long and but little attenuated. Fertile verticils bunched; bunches complicated by axiliary shoots; the first segment of the fertile leaf is very short, bearing seeds and some (2) small, 3-celled, lateral leaflets (rays); the terminal leaflet larger, 3-celled, *the middle or even the lowest cell the longest.* (Italics mine. T. F. A.) Terminal cell always long, curved, attenuated, rounded at the point. The innermost fertile leaves are very short and apparently (to me) without lateral leaflets, only with seeds on the first node, and monœcious, though I saw the antheridia fallen from the plant only. Sporangia with a short, blunt, rounded coronula, often with the base of the latter much swollen, several together, seldom with short stipes. Nucleus *brown*, with 9 striæ and slight angles. Sporangia 580–600μ long, 420–430μ broad, nucleus 360–400μ long, 300–320μ broad; antheridia 360μ in diameter.

"Swamps near Columbus, Ohio (com. Lesquereux, 1855). The specimens are mixed with another species, apparently *N. flexilis*."

I have been unable to obtain specimens of this species, nor does Professor Lesquereux know the locality in which it was collected. I await its rediscovery.

Tolypella glomerata, Leonh.,—This is characterized as follows, by A. Braun in his Characeæ of Africa:

"Statura mediocris, color incrustatione glaucus vel cinerascens. Folia verticillorum sterilium indivisa, fertilia capitulorum (et nonnunquam transitoria) simpliciter divisa, radiis 3–4- cellularibus parum attenuatis obtusis. Sporangia in divisura foliorum et in fundo verticilli aggregata, nucleo ovali, 0.30–0.36$^{mm.}$ longo, fusco, 8–9-gyrato."

Var. ABBREVIATA, *nov. var.*, differs as follows;

Statura variabilis, color incrustratione cinerascens vel munda. Folia et sterilia et fertilia *abbreviata*, radiis 3-cellularibus vix attenuatis obtusis. Sporangia aggregata, coronula evanescente, nucleo fusco 300–335μ longo, striis 6–8, acutis vix prominulis. Antheridia longe stipitata 230–380μ diam.

I have thus far discovered two forms: one, *forma incrustata*, large, to 0.15$^{m.}$ high, densely incrusted, with smaller antheridia (230μ in diam.) and larger nuclei (335μ long), striæ 7 to 8. Collected by Mr. Pringle in alkaline pools in Arizona, April, 1881, and again in 1882. The other, *forma pygmæa munda*, small, 0.02–0.03$^{m.}$ high, without the slightest incrustation, with very short leaves (as above), larger anther-

idia (380μ in diam.) and smaller nuclei (300μ long) with only six striæ, collected by Prof. Macoun, Canada, Pacific R.R. survey, west of the Saskatchewan, August, 1881. With all these differences I do not, however, feel warranted in giving either form a distinct name, since the general habit of the plants seems the same, namely, the short leaves and rays, the persistently three-celled and not attenuated terminals, the equally stipitate antheridia, similar sporangia and nuclei with varying striæ, in both sharp and slightly prominent. Other forms will doubtless be discovered which will enable us to group them with greater certainty.

In my plants the sporangia are numerous in the fundus of the verticil, both without and within the base of the leaves; but, on the fertile node of the leaf, they are regularly disposed on the ventral aspect, two, with the intermediate, rather long-stalked antheridium, while there are regularly three leaflets or rays on the dorsal aspect. The coronula is evanescent, and the ends of the enveloping cells of the sporangium are swollen (Plate Fig. 4). Mr. Pringle's plants have mature fruit in April (the usual time for *T. glomerata*), and Prof. Macoun's are in their prime in August. This fact, together with the much larger antheridia and rather smaller nuclei of the latter, with only six striæ, may prove sufficient to distinguish the forms as distinct sub-species. Further collections are needed.

TOLYPELLA COMOSA, *nov. sp.*—Minor, monoica, statura 0.05–0.10$^{m.}$, color incrustatione cinerascens. Folia verticillorum sterilium indivisa, 3- articulata, fertilia in capitula congesta, simpliciter divisa, radiis 3- cellularibus, obtusis, non attenuatis. Sporangia in divisura foliorum et in fundo verticilli aggregata; coronula evanescente; nucleo atro, ovali 425–475 μ long., 320–360 lat., 7–8- gyrato, striis prominulis, obtusis. Antheridia sessilia, 400–425 μ diam.

This plant is allied to the European *T. nidifica*, Leonh., from which it differs in its fresh water habit, smaller size, smaller antheridia and persistent coronula. It is thickly incrusted, having a greyish color even when first taken from the water, and is quite fragile. The fertile whorls are compact and compound, from numerous short axillary shoots. The leaves of the sterile verticils are simple, long, and have three segments. The fertile leaves have a short basal segment, then a fertile node consisting usually of three leaflets of unequal length, and three fruiting cells on the ventral aspect; these produce, usually, two sporangia and one intermediate antheridium, but occasionally we find two antheridia and one sporangium. The central cell is, however, always an antheridium, and the latter is sessile or nearly so. The lateral leaflets are longer than the dorsal leaflet; the terminal division of the leaf, above the fertile node, is elongated, 2–8$^{mm.}$, and three-celled. These numerous elongated leaflets clothe the plant as with hairs, hence the specific name *comosa*. The first segment of the leaflets is the longest, and the terminal segment usually the shortest. The diameter of the leaf, below the fertile node, averages 300μ (in T. *nidifica*, 400μ), of the terminal segment near the tip 100μ, (in *nidifica*, 190μ.) The main stem, below the first fertile verticil, averages 360μ in diameter. The primary verticil consists of seven leaves with some adventitious leaflets and sporangia, which

are usually developed from the cells of the basal leaf-node external to the verticil, though a few are seen within the whorl, The sporangia at the fundus of the verticil are comparatively few in this species.

This plant was gathered in company with *T. intertexta*, Allen, in Seneca Lake, N. Y., near Geneva, at a depth of about ten feet of water, in August, 1882.

Tolypella prolifera,* Leonh.—Plant large, clothed with broad and elongated green leaves, rarely incrusted. Sterile leaves simple, three to four-celled, elongated, acute. Fertile leaves with two (rarely three) fertile nodes and a three- to four-celled terminal, acute; rays of the leaf two to three at each node, 3–4-celled, mostly simple (fertile nodes have rarely been seen on the rays of the leaf in American plants), acute. The mucronate tip of the leaves and rays is somewhat elongated, never short and abrupt, from 100 to 120μ long, and 45–50μ broad at base; the leaf just below this tip is about 100μ in diameter. Sporangia numerous in the fundus of the verticil and on the ventral aspect of the leaf-nodes; coronula persistent, superior cells longer than the inferior; nucleus chestnut-colored, round-oval, 345–375μ (the largest fully mature) long, 300μ broad; striæ 8–9, inconspicuous. Antheridia short-stipitate, 300μ in diameter.

I am fortunate in possessing some of E. Hall's original specimens, determined by the late Prof. Braun, and have been able to compare other plants with this. Braun, in Nordstedt's "Fragmente," gives as localities: from Engelmann's herbarium, "Upper Missouri, Pinois Springs, Hayden's survey, *Forma munda cinerascens*, 1858," and "Athens, Illinois, E. Hall." It has been sent to me by Prof. Macoun, "Flora of the great Plains, railway survey, Canada, near Bottsford, Aug. 6th, 1879:" I have also received very young plants, having numerous, long, sterile leaves from the base, overtopping the whole plant, from Mr. Horsford of Vergennes, Vt., though there is some doubt as to their determination.

Doubtless the species will be found to be not uncommon in the northern portions of the country and in Canada.

TOLYPELLA FIMBRIATA, *nov. sp.*—Statura mediocris, 0.15–0.20$^{m.}$ alt., viridis. Folia verticillorum sterilium indivisa rarissime divisa, 2–3-articulata, acuta. Folia fertilia duplicato divisa, radiis fertilis 3–4-cellularibus. Sporangia in divisura foliorum et in fundo verticilli aggregata, coronula persistente, cellulis superiorbus longioribus quam inferioribus; nucleo fusco, ovali, 425–450μ long, 330–350μ lat., oxygyro; striis 9–10, *prominulis*, *acutis*; antheridio stipitato, 300–335μ diametro.

From *T. prolifera*, to which this species is most nearly allied, it differs in its smaller size, larger fruit, oval nuclei, with more numerous and prominent sharp angles.

The plant has a long, simple stem, naked (with perhaps one small verticil near the base) nearly to the compact head of fertile leaves. Just below this is usually the sterile verticil of 7–9 leaves, 0.05–0.08$^{m.}$ long, which extend far beyond the fertile head, forming a coarse fringe or involucre of leaves. Very rarely, the sterile leaves are divided, I have seen but one specimen divided:

* Description taken from American specimens. No satisfactory description of the species has as yet been given.

T. Californica, A. Br.—The following is taken from Braun's "Fragmente," edited by Norstedt, 1883.

"Color, a fine dark green, without incrustation. Habit somewhat similar to *T. nidifica*, but with more numerous verticils and heads, one above another; nothing of the long lower leaves could be seen in in the fragments. The number of leaves, whether the lower were simple and whether there were sporangia in the fundus of the verticils, must be determined by better specimens. Terminal cell 0.10–12$^{mm.}$ long, about 0.05$^{mm.}$ broad. An antheridium which had fallen off measured 0.44$^{mm.}$ in diameter, but further measurements are needed. Sporangia almost globular; nucleus dark brown, but transparent, with 8–9 visible "windings" (on one side), *smooth*, 0.38$^{mm.}$ long, 0 32$^{mm.}$ broad. Very nearly related to *T. nidifica*, but distinguished by its sharp tips; from *T. apiculata*, separated by its smaller sporangia with fewer windings, and by its general appearance; also distinct from *T. longicoma* by its many-celled segments and sharp tips, as well as by the shortness of the ultimate cells.—North America, Maria County, California, under willows, in slow-flowing streams. H. Bolander, Mar. 27th, 1865, comm. Dr. Engelmann, Aug. 1869."

I have received specimens from Dr. Engelmann from "Marion Co., Cal., H. Bolander, April, 1863," and have also examined very fine and perfect specimens in Prof. Gray's Herbarium at Cambridge, from "Swamps near San Rafael, Marion Co., Cal.," and am able to supplement Prof. Braun's description as follows:

Plant 0.10$^{m.}$, becoming much branched (bushy): the fertile verticils on elongated peduncles, not crowded into dense masses; stems grass-green, conferva-like, about 600μ in diameter. Sterile nodes two to four, of 12–15 leaves; of these, 6–8 seem to be normal and the others shorter and adventitious. Leaves about 360μ in diameter, once divided into four leaflets, which are 4–6- or 7-celled; the adventitious leaves (intermediate in the verticil and not in the normal series), are usually shorter and not divided. The measurements of the leaflets gave the following diameters: first segment 285, second 240, third 210, fourth 150, fifth 135, sixth (or mucro) 50 broad and 170μ long. The articulations are some what constricted and the walls thin and diaphanous. The fertile verticils are densely crowded with leaves and fruit, the internodes being very short (as in other *Tollypellæ*). The fertile leaf has usually two fertile nodes, each bearing three fruiting-cells (one antheridium and two sporangia) on its ventral aspect and three leaflets or rays on its dorsal. The rays and longer terminal leaflet are 4–6-celled. Sporangia nearly globular, *coronula persistent*, the ultimate cells somewhat elongated. Nucleus brown, with 8–9 striæ, which are not prominent, varying from 285–335μ long and 300–320μ broad. Antheridium rather long-stalked, 240–265μ in diameter (I saw none so large as those Prof. Braun speaks of). Sporangia in the fundus of the verticil, but not as numerous as in some other species.

T. STIPITATA, *nov. sp.*—Statura 0.10–0.15$^{m.}$ alt. Color viridis. Folia verticillorum sterilium divisa, ter-articulata, acuta. Folia fertilia divisa, nodis fructificationem gerentibus duobus, radiis indivisis 3-cellularibus acutis. Capitula fertilia laxa. Sporangia in divisura foliorum et in fundo verticilli aggregata numerosissima, longe stipi-

tata; coronula persistente, cellulis non elongatis ; nucleo fusco, 335μ longo and 260μ lat., 7–8-striato, striis acutis, sub-prominulis. Antheridio 275–300μ diametro, longe stipitato.

This interesting species appears to be intermediate between *T. Californica* and *T. intricata*. From the former it differs in the fewer segments of the terminals, and from the latter in the simple rays and smaller sporangia and antheridia. It has a loose habit of growth, the fertile verticils having comparatively long peduncles, not crowded into so dense heads as in other species. The fundus of the verticils is crowded with sporangia and antheridia on long stipes, which seem to take the place of leaves. There are but few leaves, generally four, to each verticil, with two shoots of new verticils (as shown in Plate). The peduncle of the fertile head measures 2.40$^{mm.}$ from the verticil to the first fertile whorl, 2.40$^{mm.}$ to second whorl, 1.50$^{mm.}$ to third 1.20$^{mm.}$ to fourth, showing the looseness of the compound fertile head. In *Tolypellæ* generally, the separation of the verticils of the fertile heads is very slight, so that a compact mass is formed.

I have received but one specimen of this species, collected by Mr. T. S. Brandegee, in a pond near Mt. Carbon, Elk Range, and forwarded to me by Mr. John H. Redfield of Philadelphia.

T. intricata, Leonh.—Monœcious. Robust, 0.20—0.40$^{m.}$ high; growing in mossy bunches; light green, in age becoming greyish or brown with incrustation, and brittle. Stem much branched from the base up. Lower verticils long-leaved, spreading; the upper shorter, compacted into a thick head (nest-like). Verticils composed of 6–7 large leaves, with as many more small (accessory) ones. Sterile leaves once divided, the fertile ones mostly twice divided. Fertile leaves with 2–3 nodes producing leaflets; leaflets of unequal length, 4–5-celled, those of the first leaf-node divided, fertile, attenuated to the tip, the terminal cell short and acute. Sporangia on the nodes of the leaves and rays, and very numerous in the fundus of the verticil. Coronula persistent; nucleus light brown, oval, with 10–11, prominent angles. Antheridia 320–350μ in diameter.

This species germinates in the fall and fruits in the following spring, ripening by the end of April or in May, and quite dying down and disappearing by the beginning of June (in Europe).

I have received one specimen of this species from Canada (a typical form), and it is to be expected from various parts of the country.

T. INTERTEXTA, *nov. sp.*—Statura robustior, 0.4–0.5$^{m.}$ alt., color incrustatione demum cinerascens. Verticillis inferioribus remotis, foliis sterilibus 8, 60–80$^{mm.}$ long., divisis; terminalibus 4-cellularibus, acutis. Folia fertilia duplicato (vel rarius triplicato) divisa, nodis fructificationem gerentibus duobus; radiis divisis, fertilibus 4-cellularibus (rarius 3–5), acutis, mucrone 85μ long., 55–65μ lat. Sporangia in fundo verticilli et in divisura foliorum aggregata, coronula elongata, sub-persisente; nucleo ovali, 450–475μ long., fusco, 10-gyrato, striis acutis, sub-prominulis. Antheridia brevi-stipitata, 320–350μ diametro.

This large and handsome *Tolypella* differs from its allied species, *T. intricata*, by its habit, its large sporangia, its peculiar coronula and

the time of fruiting (fall). The leaves are abruptly pointed with a short and stout mucro. The sporangia are numerous, often double from a single cell (as in Plate XLII., Fig. 3). The coronula is peculiar in its oblique direction and sub-persistent character, and becomes detached when the sporangium is quite old. The dense interweaving of the divisions of the leaves surrounding the fertile heads suggests the specific name.

Gathered from deep water (10–15 ft.) in Cayuga Lake, N. Y., August, 1882. I have also received a fragment from Canada, collected by Miss Cary, and sent by A. L. Kemp, LL.D.

EXPLANATION OF PLATE XXXVII.—Fig. 1. Plant, natural size from Arizona. Fig. 2. Sketch of the base of a verticil showing the simple, sterile leaves, not longer than the compact fruiting verticils, which are incompletely outlined. Fig. 3. A portion of the stem, showing two crowded fertile whorls with numerous sporangia at the base of the leaves. Fig. 4. A mature sporangium. Fig. 5. A mature nucleus. Fig. 6. A tip of a leaf. (Figures 2 to 5 are from the Arizona plant, and Figures 7 and 8 from the dwarf Canada plants). Fig. 7. A node of a leaf, the antheridium having fallen. Fig. 8. A sporangium prior to the falling of the coronula.

EXPLANATION OF PLATE XXXVIII.—Fig. 1. Plant, natural size. Fig. 2. A fertile node magnified 25 diameters, showing the fertile cells all on the ventral aspect, usually with two sporangia and one antheridium. In some places the fruit has been rubbed off in preparing the specimen for the camera. Fig. 3. A fertile node of a leaf, ventral aspect, showing two antheridia and one sporangium. Fig. 4. Dorsal aspect of a fertile node, showing three unequal, 3-celled leaflets. In all these figures space does not permit the delineation of the long terminals of the leaves. Fig. 5. The apex of a sporangium, showing the evanescent coronula, magnified 200 diameters. Fig. 6. A mature nucleus with eight prominent, blunt angles, magnified 50 diameters.

EXPLANATION OF PLATE XXXIX.—Fig. 1. Plant natural size. Fig. 2. A portion of a fertile verticil, with two nodes of a leaf and two fertile rays on the lower node, magnified 25 diameters. Fig. 3. A fertile leaf-node showing the stipes of two antheridia, which have fallen, magnified fifty diameters. In this species we frequently find two antheridia (central) and two sporangia (lateral on the ventral aspect of a leaf; in which case there are usually but two rays on the dorsum of the leaf. Fig. 4. The coronula magnified 200 diameters. Fig. 5. A mature nucleus magnified 200 diameters. Fig. 7. Tip of leaf.

EXPLANATION OF PLATE XL.—Fig. 1. Plant, natural size (fresh specimens will modify this sketch). Fig. 2, A leaf magnified 25 diameters, showing the undivided sterile rays. Fig. 3. The tip of a sporangium, showing the persistent coronula x 200 diameters. Fig. 4. A mature nucleus, magnified 50 diameters. Fig. 5. The node of a sterile leaf, showing its division into 4 leaflets x 25 diameters. Fig. 6. The tip of a leaflet magnified 50 diameters.

EXPLANATION OF PLATE XLI.—Plant, natural size, with the fertile heads on one branch at A, the other heads having been removed (as at B) to show the arrangement of the sterile leaves. Near the bottom of the stem there is a small verticil of sterile leaves. Fig. 2. A fertile shoot, taken at A in Fig. 1, magnified 5 times to show the general form. All the sterile leaves have been removed, except from the lowest fertile verticil. Usually there are four sterile leaves, each divided into four leaflets, and two shoots bearing new fertile verticils from each verticil. Some of the normally sterile leaves of the upper verticils become fertile. There are usually 5–6 successive series of fertile verticils, the uppermost bearing fruit in the verticil, and about six fertile leaves (magnified 5 diameters). Fig. 3. A fertile verticil with numerous, long-stipitate fruits, showing at B, the basal node of a leaf that has been removed; magnified 40 diameters. Fig. 4. The dorsal aspect of a fertile ray x 40. Fig 5. The ventral aspect of a node of a fertile ray (the antheridium removed), magnified 25 diameters. Fig. 6. The apex of a ray, showing the long slender point, magnified 200 diameters. Fig. 7. The coronula of a sporangium magnified 200 diameters. Fig 8. A mature nucleus magnified 50 diameters.

EXPLANATION OF PLATE XLII.—Fig. 1. Plant natural size, showing only the upper portion. Fig. 2. A portion of a leaf, showing two fertile nodes, and fertile rays from the lower node, magnified 25 diameters. Fig. 3. Another leaf, showing two twin sporangia, each pair from one cell (divided horizontally). Figs. 4 and 5. Tips of leaves, magnified 200 diameters. Fig. 6. The elongated oblique coronula. Fig. 7. Top of an old sporangium after the coronula has become detached. Fig. 8. The nucleus magnified 50 diameters.

New Species of Fungi.

By J. B. ELLIS and BENJAMIN M. EVERHART.

SPHÆRELLA (LÆSTADIA) POLYSTIGMA.—Perithecia large, scattered thickly over the lower surface of the leaf, covered by the blackened cuticle, subhemispherical, collapsing; ostiolum papilliform, at length perforated; asci 35–40x8μ, oblong, sessile; sporidia biseriate, ovate-elliptical, continuous, subhyaline, 10–12x3–4μ, in shape very much like apple-seeds.

Allied to *S. carpinea*. On fallen oak-leaves. Ohio. Kellermann.

SPHÆRELLA PANDURATA.—Hypophyllous; perithecia globose (.17–.25$^{mm.}$), buried in the substance of the leaf, and, except the slightly projecting, rounded apex, covered by the blackened cuticle; ostiolum papilliform, minute; asci oblong-cylindrical, 50x7μ; sporidia biseriate, fusiform, 4-nucleate, yellowish, constricted in the middle and bulging out each side of the constriction, 10–12x3μ.

On fallen oak-leaves. Plainfield, N. J., September, 1883. G. F. Meschutt.

MELANCONIS EVERHARTII, Ellis.—Perithecia globose (.25$^{mm.}$) in compact clusters of 4–18, just under the outer layer of the inner bark, which is raised into little tubercles about 1$^{mm.}$ in diameter, from which arise, in a compact fascicle, piercing the epidermis, the short-cylindrical, obtuse ostiola, their tips perforated with a rather large circular opening; asci clavate-cylindrical, 114–120x19μ; paraphyses stout, sparingly septate and granular; sporidia biseriate, oblong-elliptical, uniseptate, nearly hyaline 34–38x11μ.

On a fallen sapling of maple. West Chester, Pa., June, 1882.

The ostiola throw off the epidermis, and the perithecia themselves soon after fall out, leaving light colored, circular spots which mark the place of their attachment. The fruit is almost exactly that of *M. Modonia*, Tul., but the more elongated ostiola, the smaller perithecia and deciduous habit distinguish it.

MELANCONIS (MELANCONIELLA) MESCHUTTII.—Perithecia 10–20 (.25x.33$^{mm.}$), circinating in a thin, lenticular, black, orbicular or elliptical stroma seated on the surface of the inner bark; ostiola short cylindrical, united in a dirty brown disk bursting through transverse cracks in the epidermis, their tips, in well developed specimens, distinctly 4-cleft; asci (spore-bearing part) about 75x10μ; sporidia biseriate, elliptical, very slightly curved, uniseptate and slightly constricted, subhyaline at first, with a faint, transparent, horn-shaped appendage at each end, but these soon becoming absorbed and the spore becoming brown, 14–16x6–8μ (mostly 15–16x6μ.)

On dead limbs of birch. Plainfield, N. J., June, 1883. George F. Meschutt. *Gelatinosporium betulinum*, Pk., occurs on the same branches, and where the epidermis is weaker, the appearance of the

stroma is different, it being more prominent, and the epidermis being irregularly laciniate-cleft around it. The perithecia soon collapse, so that, on stripping off the epidermis, their position is indicated by little circular concavities around the margin of the stroma. This is closely allied to *M. Decoraënsis*, Ell., but differs in its smaller perithecia and narrower *appendiculate* sporidia.

MELANCONIS (MELANCONIELLA) BIANSATA.—Perithecia circinating in a stroma scarcely different from that of the preceding species, globose, .75$^{mm.}$ in diameter, soon collapsing, 6–10, their short, cylindrical ostiola with 4-angled or imperfectly cleft tips, united in a dirty brown, narrowly elliptical or suborbicular disk, which slightly rises and bursts through the epidermis by which it is closely girt; asci 190–200x300μ, evanescent, (8 spored?); sporidia oblong-elliptical, uniseptate, soon becoming brown, and generally with a short, stout, tuberculiform projection at each end, length, without appendage, 35–45x15–19μ.

Found on the same limbs with the preceding species.

VALSA FAGICOLA.—Stroma formed of the scarcely altered substance of the bark; perithecia circinating, 10–15, subglobose, membranaceous, collapsing (.33$^{mm.}$), abruptly contracted into a slender, cylindrical neck about .33$^{mm.}$ long, the necks all converging and piercing the epidermis in a small, papilliform, black disk; tips obtuse, with a rather broad opening; asci (spore-bearing part) 18–20x3μ, at first with a convex, hyaline tip which soon disappears, leaving them truncate above; (paraphyses?); sporidia biseriate, cylindrical, hyaline, curved, 2.5–3.5x.5–.75μ.

The asci are arranged in a racemose manner, like those of *Valsa ciliatula*, Fr., of which this might perhaps be considered a small form.

On dead limbs of *Fagus ferruginea*. West Chester, Pa., June, 1882. E. H. J. and G.

Pinus Banksiana.—The *Gardener's Monthly* for 1873 gives an account of the large size of *Pinus Banksiana* at Marquette and other places in the Lake Superior region. Coming across the continent from the Pacific coast over the Northern Pacific R. R., the first tree of the distinctively Atlantic group to meet us is *Pinus Banksiana*. At Motley, in Morrison County, Minnesota, the trees seemed to be about 40 feet high, and some were 4 feet in circumference. Soon after meeting these we came to *Pinus rigida*, black spruce, white pine and tamarack. The forests—if scattered groups of trees might be so called—had a comparatively young look, and seemed to tell of a natural march of forest growth westward.

THOS. MEEHAN.

Fern Notes.—Last spring I examined with considerable care the development of the prothallia of *Struthiopteris Germanica*, and found that they were very distinctly diœcious. In about five weeks from the time the spores were started the first antheridia were mature; but it was more than six weeks *later* before mature archegonia were noticed, and these were on different prothallia. The

prothallia bearing the archegonia were like those in most ferns, and had the heart shape characteristic of the fern-prothallium. In no cases were perfect antheridia found upon these, while, on the other hand, none of the male prothallia was found to subsequently develop archegonia, although carefully watched.

The male prothallia were much smaller, and, though sometimes heart-shaped, were generally more or less irregular. In a few cases, there was observed on the prothallia an antheridium, which consisted simply of a row of four or five cells, as shown in the annexed figure.

The conditions under which they were grown may have affected their development. The spores were sown rather thickly under a small glass in an ordinary room. These gave rise principally to the male prothallia, though a few developed into the female form. A number of them was transferred, when a few weeks old, to a hot-bed, and these produced a much larger proportion of the female prothallia.

The spores were gathered the last of March, having therefore remained on the plants through the winter. They began to germinate in five days from the time they were sown.

It was found that the spores of *Onoclea sensibilis* germinated with equal promptness.

On examining a number of prothallia of *Aspidium spinulosum*, gathered on the 17th inst., one was found with a well-marked fibro-vascular bundle, although the vessels were not perfect.

Detroit, Mich. DOUGLASS H. CAMPBELL.

Cleistogene flowers.—*Nemophila maculata*, Benth. At Clark's Ranch, on the Merced River in California, I found this species wholly cleistogene in June last, in the cultivated spots near the stream. As in all cleistogamous plants, every flower was fertile, and the weight of a small plant covered with-seed vessels was remarkable. Out of what must have been many hundreds of plants which came under my eye, I saw but one flower with a perfect corolla.

Impatiens pallida, Nutt.—Along the coast of Alaska, in lat. 56°, in the early part of July I found *Impatiens pallida* with all the flowers which had so far appeared, evidently cleistogene. I could find none with petals. Two weeks later, farther north, in lat. 59°, I found the same plant in apparently the same stage of flowering, with all the flowers having, or having had, corollas. I could see nothing which would suggest any satisfactory reason for the different behaviors.

Opuntia leptocaulis, D. C.—In my garden I have a large bush of the long-spined form of this species. Though several years old it has never borne a flower. Over a year ago a number of small buds appeared, but not one opened, or, indeed, advanced beyond a com-

paratively microscopic stage. But fruit resulted which has taken a full year to mature, and which the past month was of a pretty rosy red. Not a seed was found in any one. This is evidently not a case of cleistogamy, for it is probable that there were no perfect stamens in the buds, or else there would have been seeds. Still, the circumstance is interesting.

Viola sarmentosa, Dougl.—It seems scarcely necessary to put upon record that a violet is cleistogene, for any of them may be expected to be; but perhaps it is as well to note the actual fact. In the woods around Departure Bay, in British Columbia, *Viola sarmentosa* was very abundant, and, at the time of my visit in July last, all the flowers were cleistogamous.

THOMAS MEEHAN.

A Few Additions to the Berzelius Catalogue.—Upon seeing a list of plants reported by Prof. Eaton as new to the "Berzelius Catalogue" of plants growing within thirty miles of Yale College, I was reminded that I might give a similar list of those that I have found in this section of the circle.

Reseda Luteola, L., is given in the Catalogue as lost. I have since observed it in its old habitat, and also in another locality.

I am credited with finding *Viola pedata*, L., var. *bicolor*, Gray, but this is a mistake, it was var. *alba*. I have never seen the var. *bicolor* growing wild.

Erodium cicutarium, L' Her., grows at Stony Brook.

Polygala fastigiata, Nutt., grows at Atlanticville, beyond the limits of the Catalogue.

Amorpha fruticosa, L. Of this, reported as lost, I have found several specimens again.

Ammania humilis, Mx , is common on Long Island.

Hydrocotyle umbellata, L., is common on Long Island.

Galium boreale, L., I observed on the shore of the Housatonic, below Cornwall Bridge, Ct., in 1875, but probably not within the limits of the Catalogue.

Eupatorium hyssopifolium, L., is very common on Long Island.

Aster nemoralis, Ait., I have found in a sandy swamp near River Head.

Xanthium spinosum, L., formerly grew at Mt. Sinai, but I have not seen it for some years.

Achillea Millefolium, L., var. *roseum*, is common on Long Island.

Matricaria inodora, L., was formerly plentiful, but I have not seen it for several years,

Cirsium horridulum, Mx., is common on Long Island.

Vaccinium Oxycoccus, L., grows at one locality in Wading River.

Mentha aquatica, L., var. *crispa*, is found at Mt. Sinai.

Echium vulgare, L., is found at Port Jefferson.

Asclepias incarnata, L., (typical form) grows at Wading River.

Rumex maritimus, L., was found in abundance at Montauk Point in 1879. This is far beyond the limits of the Catalogue, but is interesting because it is new to the State of New York.

Amarantus viridis, L., is plentiful at East Hampton, though beyond the limits of the Catalogue.

Callitriche heterophylla, Ph., is common on Long Island.

Quercus palustris, Du Roi., is found at Manor, Long Island.

Cupressus thyoides, L., is common around River Head, where it takes the place of the red cedar.

Potamogeton hybridus, Mx. Wading River.

Potamogeton pusillus, L., var. *tenuissimus*. River Head.

Potamogeton perfoliatus, L. Northville and River Head.

Potamogeton gramineus, var. *graminæfolius*. River Head.

Spiranthes graminea, Lindl., var. *Walteri*. Wading River.

Liparis Læselii, Richard. Wading River.

Lachnanthes tinctoria, Ell., was found at Manorville this year by Hon. Isaac Coles, of Glen Cove.

Sporobolus serotinus, Gray. River Head.

Muhlenbergia sylvatica, T. & G. River Head.

Elymus Canadensis, L., is common on Long Island.

Panicum amarum, Ell., is common at Wading River, on the sound, and at River Head, on the bay.

Cystopteris fragilis, Bernh. In an old well at Rocky Point, and in a deep ravine at Wading River; not a dozen plants in both localities.

E. S. MILLER.

Additions to the Flora of Onondaga County, N. Y.—In spite of very adverse weather the Syracuse Botanical Club has made some botanical excursions during the past season, and very satisfactory ones too. We have found the following plants, which were entirely new to us:

Viola striata, Ait. (with cream-colored flowers); *Corydalis flavula*, Raf; *Atriplx hortensis*, L., found by Mrs. Charles Barnes by the road near High Bridge; *Aplectrum hyemale*, Nutt. (with bright lemon-colored flowers); sterile plants of *Humulus Lupulus*, L.; *Polygonum Virginianum*, L.; *Quercus macrocarpa*, Mx.; *Lappa officinalis*, Allioni, (with white flowers); *Erythræa Centaurium*, Pers.; a sedge not identified; *Aster linifolius*, L.; *Aster puniceus*, L. (with rose-colored flowers); *Aster simplex*, Willd.; *Aster puniceus*, L., var. *vimineus*, Gray; *Helianthus decapetalus*, L.; *Asclepias phytolaccoides*, Pursh; and *Cladium mariscoides*, Torr. Mr. Beauchamp sent to us from Baldwinsville, *Spergularia rubra*, Presl., var. *campestris*, Gray. Besides the above we have collected many species not represented in our county herbarium.

Syracuse, N. Y. MARY OLIVIA RUST.

Flora of Sam's Point.—The note by Mr. Britton in the last number of this journal, describing the botanical characteristics of Sam's Point, omits mention of some peculiarities which I noticed during a visit to this lovely spot in a most beautiful country, about the middle of September of the present year. I there saw, for the first time, the American mountain-ash (*Pyrus arbutifolia*), and was impressed with its splendid appearance. The European species (*P. aucuparia*) is cultivated in Washington and vicinity, and I have often admired the beautiful orange-colored berries; but our native species far sur-

passes it. In fact, I have never seen anything outside the tropics which, in my opinion, would compare with the large masses of deep scarlet berries displayed by *P. arbutifolia*. The species was not abundant, but was noticed in several places, growing usually in clefts of rocks, and forming a tall shrub of 5–10 feet in height. It was observed in cultivation at two places along the road leading to the Point, in one instance forming a tree some 20 feet high. Another peculiarity of the vegetation of the Point which Mr. Britton omits to mention is the remarkable form assumed by the few hemlock-trees which grow there. One was noticed which had an elevation of not more than six feet, but which expanded a rod or more (I write from memory, no measurements having been taken), the dense flat top supported on a comparatively massive straight trunk a foot or more in diameter and several feet in height. I was told of a tree (said to be a pine), of similar shape, growing at the mouth of the "ice cave" which expanded more than 30 feet, although no taller than the one just described.

ROBERT RIDGWAY.

Teratological Notes.—In the BULLETIN of July, last year, I recorded the fruiting in my garden of an *Arisæma triphyllum* with twin spadices. I have this last summer received from my brother, Professor L. W. Bailey of Fredericton, New Brunswick, Canada, who was ignorant of my previous observation, a specimen in the same condition. The flowering portion is simple, and so is the constricted neck, but above, the club-shaped appendages are distinct. Of these, one is taller than the other. The discoverer does not indicate any change in the surrounding spathe.

I have an English walnut with three cotyledons. This reminds me to say that after sending my note on *Ipomæa* (present volume, page 82), I found one in my yard with three perfect cotyledons.

W. W. BAILEY.

Botanical Notes.

The Flora of the Country Bordering the Rio Grande, in Chihuahua and Texas.—In a paper read before the New York Academy of of Sciences. Dr. Newberry says:

The country bordering the Rio Grande, in Chihuahua and Texas, is nearly destitute of trees, a feature which marks the aridity of the climate; yet, in certain localities, as on the bottom lands of the Rio Grande and Rio Concho, a vigorous and somewhat varied forest-growth was found at the advent of the whites. No better illustration of the relation between the kind of vegetation and the water supply in a country can be found than that afforded by the luxuriant growth of trees of several kinds along the Cibola in the Chinati Mountains, Texas; while on all sides this oasis is surrounded by an apparently boundless grass-covered prairie, where the rain-fall is inadequate for trees. On the mountain-summits, south of the Rio Grande is a sparse growth of piñon (*Pinus edulis*) and evergreen oak (*Quercus Emoryi.*) The lowlands in certain localities, over thousands of acres, are thickly set with mesquite (*Prosopis glandulosa*), here a

strong, spreading shrub, never a tree, but with roots disproportionately large, composed of very dense tissue and furnishing a large amount of excellent fuel. Along the arroyos, cottonwood may occasionally be seen, either the narrow- or the broad-leaved form (*Populus monilifera* or *P. angustifolia*), and more commonly the hackberry (*Celtis occidentalis*), and the nopal, the little black walnut (*Juglans rupestris*), the Mexican buckeye (*Ungnadia speciosa*), and the guayacan (*Guaiacum Coulteri*). The drier portions, especially the gravel terraces bordering the Rio Grande, are frequently covered with the creosote-plant (*Larrea Mexicana*) and *Fouquiera splendens*. The latter forms a cluster of fifteen or twenty canes, ten or twelve feet high, springing from the same root and bristling with spines an inch or more in length, of which the bases are in contact. Usually it is without leaves, and seems as though dead; but, for a brief interval in the rainy season, it is covered with small, crowded, obovate leaves, and from the summits of each stem springs one or more spikes of brilliant crimson flowers.

Among the shrubs which form the "chaparral" or thickets, the *Holacantha* is the most conspicuous, and *Salazaria* the most interesting. The former, as its name implies, is a mass of thorns, which are often as large and strong as those of the honey-locust. The branches and spines are covered with a green epidermis, which performs the functions of leaves, and, in the spring, these bear bunches of yellow flowers similar to those of *Berberis*. The *Salazaria* is a labiate allied to *Scutellaria*, and the seed is inclosed in a balloon-like capsule, similar to that of the balloon-vine (*Cardiospermum*), also found here, and having the same function, namely, dissemination by the wind. Two species of *Acacia* and one of *Berberis* (*B. trifoliata*), all spiny, help to make the chaparral as nearly impenetrable as the thickets of cactus further west. We are here fairly within the confines of the cactus country, but not in its heart. Many species differing much in habit are constantly in sight—the "nopal," an *Opuntia*, being the most common, one species growing in a mass ten feet or more in height, with each leaf-like subdivision of the stem a foot in diameter. Though covered with spines, this plant is largely eaten by cattle, and nothing is more common than to see a patch of it trampled down, half eaten, and the flattened stems notched by semicircular bites. One species or variety of *Opuntia*, growing abundantly in Chihuahua, is of a deep purple color, which makes it conspicuous and often ornamental.

The most striking feature in the botany of this region is formed by the century-plant and its allies, other species of *Agave*, *Habranthus* and *Dasylirion*, and the yuccas. In many places these are the only plants attaining any large size, and are very numerous, scattered over the plains and slopes of the mountains; the plants not crowded, but separated by intervals of a few feet, which are occupied with a luxuriant growth of gramma grass. The yuccas belong to four species, or three species and two varieties, *Yucca angustifolia* and *Y. baccata*. Of these, two rise to the height of five to fifteen feet, with trunks from six to twelve inches in diameter, the crowded, radiating leaves crowning the summit in a round or oval mass, six feet or more

in diameter, the old leaves hanging perpendicularly and forming a peculiar thatch around the trunk and extending to the ground.

The century-plant is in Chihuahua represented by a variety with shorter and broader leaves than that commonly cultivated. From the centre of the tuft, the flower-stalk rises from 10 to 25 feet in height, composed of woody tissue and standing some years after bearing flowers. These persistent flower-stalks, crowning the ridges and visible for miles, give a peculiar aspect to the scenery. The century-plants are, however, nowhere as numerous as the species of *Dasylirion*, with which they are associated, and which do not die with the effort of florescence. Further south, the agave supplies from its sweet juice the material from which an intoxicating drink is produced. In this region, however, an alcoholic beverage is obtained from the "sotol" (*Dasylirion Texanum*), which, from its abundance and the use made of it, deserves a prominent place among the economical plants of the country. Hundreds of thousands of acres are covered with this sotal, and it would seem that it might be much more largely utilized than it is for the manufacture of alcohol. The leaves are three to three and a half feet long by one a half inches wide at the base, straight, flat, and garnished on either side with strong recurved hooks. The color is yellow-green, and the leaves are very numerous. From the centre rises, at a certain stage of growth, a woody flower-stalk, ten feet high and at the base as large as one's arm. The trunk rises but a few inches above the ground and is completely concealed. The top of this trunk, composed of the closely imbricated leaf-bases, which are broad, yellow, shining, succulent and sweet, with a pulpy mass at the centre, containing much saccharine matter, raw, or better roasted, is palatable and nutritious; so much so, that in the country where it grows it is said the Indians never really suffer for want of food, as this affords them an abundant if not varied aliment.

In the preparation of sotol whisky—a liquid called *mescal*, as is also that made further west from other plants—the portion of the plant which has been described is trimmed so as to resemble a head of cabbage, then roasted and fermented, the product of the vinous fermentation being distilled in the ordinary way. For roasting the sotol, a pit is dug, some ten feet in diameter and four feet deep, lined with rude masonry. In this a fire is built, and when it has been burned down, the pit is filled with several hundred sotol heads. When roasted, they are chopped in pieces and fermented in vats.

Another interesting plant, the companion of the sotol, is the "lechuguilla" (*Agave heterocantha*), of which the leaves furnish a strong fibre, universally employed for ropes, sacks, etc., in Northern Mexico. This grows on the mountain slopes, generally at an elevation of about 4,000 to 5,000 feet, is common in all Northern Chihuahua, and especially abundant on the Chinati Mountains in Texas.

The Syracuse Botanical Club.—We are informed that, owing to ill health, Mrs. Grifford has been obliged to resign the position of Corresponding Secretary of the Syracuse Botanical Club, and that Mrs. S. M. Rush has been elected to fill the vacancy.

BULLETIN
OF THE
TORREY BOTANICAL CLUB.

Vol. X.] New York, December, 1883. [No. 12.

New Western Plants.

By Edward Lee Greene.

Draba asprella.—Roughish-pubescent with short stiff hairs, which are either simple, or parted above the middle into from two to four divaricate branches; stems a span high, from a biennial or perennial root, leafless except at base; petals showy, yellow; pedicels .5 inch long, divaricate, bearing silicles of one-third their length, which are ovate-oblong, scarcely compressed, and tipped with a long style.

Lynx Creek, Northern Arizona, May 31, 1883. H. H. Rusby. With the habit of *D. Mogollonica*, Greene (*Bot. Gaz.*, v., 157), but very different. The peculiar pubescence covers the leaves, stem and pedicels throughout, extending in shorter and simple hairs to the long-oval pods. I am informed by Dr. Gray that this was collected near Prescott by Dr. Edward Palmer in 1876, and is his No. 565; though his specimens were in flower only, and therefore the species was left unnamed and undescribed.

Polygala Rusbyi.—Hoary-pubescent, 2–6 inches high; stems numerous, much branched, spineless; leaves ovate to ovate-oblong, acute or obtuse, one-half inch long, sessile, or nearly so; bracts scarious; pedicels 2–4 lines long; sepals pubescent and ciliate, the outer slightly saccate at the base; wings oblong, flesh-colored, 4–5 lines long; lateral petals linear, a little longer than the yellow keel, which has a long, nearly straight beak, a little widened at the apex; young capsules broadly obovate, emarginate, nearly smooth; seed not seen.

Collected near Prescott, Arizona, April 1883, by H. H. Rusby.

Near *P. subspinosa*, Wats., but more pubescent, wholly spineless, and with a different beak. Mr. Watson informs me that it was collected by Dr. Palmer in 1870 and in 1876, and that it is referred to in the original description of *P. subspinosa* as a more pubescent form of that plant.

Cotyledon Rusbyi.—Acaulescent, glabrous; rosulate leaves obovate-oblong, sharply acuminate, 1 inch long; flowering-branches scape-like, 3–6 inches high, leafless, but with some scattered, subulate bracts; pedicels slender, 3 lines long; sepals oblong, less than half the length of the petals; petals lanceolate, acuminate, 3–4 lines long, united only near the base, nearly coral-red.

San Francisco Mountains in South-eastern Arizona; collected by the writer in 1880, and also by Mr. H. H. Rusby in 1881. A small species.

Œnothera (chylismia) divaricata.—Rather short and apparently 2–3 feet high, the stem and branches hirsute; lyrate leaves hoary; calyx-tube funnelform, a line or two long; tips of the lobes free; petals white or rose-color, 4–6 lines long; capsules linear, 2–3

inches long, divaricately spreading on bracted pedicels 1–3 lines long, surrounded by a narrow, minutely crenulate margin.

A California plant, but the exact locality unknown. The only specimen was detected in a bundle of "*Cruciferæ*" in that portion of the Geological Survey collection which was deposited in the University. The species is particularly well marked; and, by its narrowly winged seeds, is related to *Œ. pterosperma*, Watson, but in size and habit it is more like *Œ. brevipes*, Gray. The horizontally spreading, or a little deflexed capsules are peculiar, and suggest the specific name.

BIGELOVIA TRIDENTATA.—Shrubby, glabrous and glutinous; foliage densely fascicled and clothing thickly the rigid branches; leaves an inch long, coriaceous, narrowly cuneate, 3-toothed, or 3-cleft at the apex, the teeth or short lobes acute; heads short-peduncled, three-fourths of an inch long, racemosely or thyrsoidly arranged toward the ends of the branches; involucral scales in many ranks, with short, acute, more or less hispid-ciliolate and squarrose-spreading tips; akenes pubescent.

Mixed with *Bigelovia Menziesii* in the Cedros Island collection of Dr. Veitch. But it is so distinct from that species, both in general aspect as well as in technical character, that it is strange they should have been confounded. It is remarkable among *Bigeloviæ* for its densely fascicled foliage, its hard, woody stems being hidden by the abundance of leaves. Its inflorescence is nearly that of *Applopappus squarrosus*, to which it has a stronger likeness, than to any *Bigelovia*.

BIGELOVIA ACRADENIA.—Shrubby and much branched, a foot or more high, glabrous and very glutinous; leaves narrowly oblanceolate, rigid, entire, an inch or more long; heads corymbose clustered, 3–4 lines long, 6–10-flowered; involucre narrowly campanulate, its scales regularly imbricated, their tips obtuse and bearing a conspicuous resiniferous gland beneath the epidermis; akenes turbinate, very silky.

On the Mojave Desert, collected by Dr. Parry and the writer, September, 1881. Closely related to *B. Menziesii*, but of very different habit, being diffusely branched, and forming compact, rounded, broomy tufts. The heads are only half as high as those of that species, and have but half as many flowers, and the tips of the involucral scales, distended and filled with resin, are peculiar.

ANTIRRHINUM KELLOGGII.—A foot or two high, glabrous and slightly glaucous, not at all glandular or viscid; leaves broadly lanceolate, 1–1.5 inch long, tapering to a short petiole; peduncles axillary, slender, twice the length of the leaves, but not prehensile; sepals lanceolate, 2 lines long; corolla .5 inch long, merely gibbous at base.

Summit of the Sierra Nevada; Dr. H. Kellogg, July 20, 1870. An alpine species, to come between *A. Kingii* and *A. strictum*. Though simple and slender, with very long peduncles, it does not appear to be a climbing species, and Dr. Kellogg notes that it grows near snow, in patches by itself. The single specimen collected is young and without fruit; but it indicates a very distinct and interesting species.

PENTSTEMON KLEEI.—Near *P. Rattani*, 1.5–2.5 feet high, ill-scented, light green, and not glaucous, glabrous up to the glandular pubescent, narrow thyrsus; leaves sub-coriaceous, rather remotely and sharply serrulate or denticulate, the radical ones lanceolate, the cauline ovate-lanceolate, cordate and even the lowest more or less connate-perfoliate; sepals oblong and obtuse; corolla lilac-purple barely .75 inch long, the tube equalling the calyx, the lobes short-oblong, very obtuse; sterile filament long-bearded on the upper side nearly half way down.

On the summit of Ben Lomond, the highest peak of the Santa Cruz Mountains, California. Collected by Mr. W. C. Klee in the month of June, 1883.

A New Genus of Sphæriaceous Fungi.

By CHAS. H. PECK.

NEOPECKIA, Saccardo.

Perithecia carbonacea, subfragilia, superfcialia sed subiculo copioso effuso semiimmersa, globosa, papillata, denique latiuscule pertusa. Asci octospori, elongati, copiose paraphysati. Sporidia didyma, fuliginea.

A genere *Amphisphæria* subiculi copiosi presentia differt, ab *Enchnosphæria* et *Eriosphæria* sporidiis perfecte didymis, fuligineis recedit. Genus inter Pyrenomycetes phæodidymos locandum, clarissimo mycologo C. H. Peck, speciei typicæ illustratori jure meritoque dicatum.

NEOPECKIA COULTERI (Peck) Sacc.—*Sphæria Coulteri*, Peck in Hayden's U. S. Geol. Survey, 1872, p. 792; *Enchnosphæria* (?) *Coulteri* (Peck) Sacc., Syll., Vol. ii., p. 207; *Lasiosphæria acicola*, Cooke, Grevillea, Vol. viii., p. 87, 1880. *Amphisphæria* (?) *acicola* (Cooke) Sacc. Syll., Vol. i., p. 727.

Perithecia .5$^{mm.}$ diam., demum papilla amissa, perforata; asci, pars sporidifera 130–140=14–15; paraphyses copiosæ, filiformes; sporidia utrinque obtusiuscula, 20–28=9–10, intense fuliginea.

Habitu externo *Enchnosphæriæ Pinetorum* peraffinis, sed fructificatio prorsus aliena.—P. A Saccardo.

The specimens on which this species was founded were collected near Yellowstone Lake, Wyoming Territory, by Prof. J. M. Coulter, to whom the species is dedicated. The fungus has since been collected on the Sierra Nevada Mountains, California, by Mr. C. G. Pringle. The type specimens of *Lasiosphæria acicola*, Cke., are recorded: "On pine-leaves, Rocky Mountains." They are credited to Dr. Lyall.

The genus, as already stated by Professor Saccardo, is distinguished from *Amphisphæria* by its subiculum, and from *Enchnosphæria* and *Eriosphæria* by its colored spores; from *Rosellinia* by the uniseptate spores.

The subiculum creeps over the dead leaves and twigs, binding them together and forming a soft, tomentose, brown or reddish-brown stratum, in which the numerous perithecia are involved.

These are more or less closely gregarious, rather fragile and at first furnished with a distinct and usually naked apical papilla or ostiolum, which at length disappears, leaving the perithecium rather widely perforate. Sometimes the subiculum has a smooth or submembranous appearance as if collapsed from excessive moisture, and then the perithecia are more prominent, but still they retain their unpolished tomentose surface. The asci are cylindrical and obtuse at the apex. The spores are oblong or oblong-elliptical, uniseriate, uniseptate, colored, constricted at the septum, .0009 to .0011 inch long, .00035 to .00045 inch broad. In some conditions they appear as if involved in a thin colorless mucus.

New Species of Grasses.

By Geo. Vasey.

Agropyrum scribneri.—Culms densely tufted, geniculate and decumbent near the base, one to one and a half foot high, rather slender. Leaves very short, two or three on each culm, the upper sheath twice or thrice as long as the blade, ligule obsolete, blade 1–1.5 inch long, 1–2 lines wide, rigid, attenuate-pointed. Spike 2–3 inches long, closely or sometimes lax-flowered, but the spikelets always longer than the internodes of the spike. Spikelets 3–6-flowered, outer glumes linear-lanceolate, 3–5-nerved, extended above into a long point (.5–1 inch), smooth except the hispid point. Flowering-glumes oblong-lanceolate, the base 4–5 lines long, smooth, about 5-nerved, sometimes slightly bidentate at the apex, the midnerve extended into a strong, spreading or recurved hispid awn. Palet equalling the flowering-glume, acute, except on the hispid marginal nerves.

This plant, although in the spike resembling *Agropyrum caninum*, differs notably in its tufted habit, its low size and smooth, rigid, sometimes glaucous leaves. It is perhaps the *A. caninum*, var. *Gmelini*, Ld. Mr. Scribner remarks that it is found only high up on the mountains near the timber-line, growing in scattered tufts in crevices and among the loose rocks, recognized by its low, usually prostrate stems, short leaves, with somewhat inflated sheaths, and long, divergent, awned spikes. It was collected by Mr. C. G. Pringle in the Sierras in 1882, altitude 9,500 ft., and distributed as *Triticum caninum*, L.? It was collected the past season in Montana by Mr. F. L. Scribner, to whom I take pleasure in dedicating it.

Sporobolus Buckleyi.—Culms 2 ft. high, compressed below, as are the smooth, striate sheaths; ligule a short, ciliate fringe, also a ring of short hairs externally at the top of the sheath.

Panicle 9–10 inches long, oblong, very open, lax and graceful, branches erect, mostly single, occasionally in twos, capillary, the lower

ones about 4 inches long, gradually shorter above, the lower third naked, the branchlets short (mostly less than one-half inch), numerous, loosely few-flowered, somewhat recurved.

Spikelets purplish, less than a line long; the outer glumes unequal, acute, the lower one one-third shorter than the upper, which is a little shorter than the flower and scabrous on the keel; flowering-glume lanceolate, acute, smooth, except on the keel near the apex; palet nearly equalling its glume.

This is a well marked species, having somewhat the general appearance of *Leptochloa mucronata*, with a more graceful panicle. It grows in Texas, and was discovered by Dr. S. B. Buckley, after whom it is named.

Contributions toward a List of the State and Local Floras of the United States

THE WESTERN STATES.*

INDIANA.

The Trees of Indiana. By Thomas B. Elliott. (D.)
In Trans. Indianapolis Acad. Sci. 1872.

Catalogue of the phænogamous and vascular cryptogamous Plants of Indiana. By J. M. and M. S. Coulter and C. R. Barnes. (B).
8vo, pamph., pp. 38. Crawfordsville, 1881.

Catalogue of the Flora of Central-Eastern Indiana (alpine or elevated district of the State). By A. J. Phinney, M.D. (B.)
In 12th Report of the State Geologist. Indianapolis, 1883.
(Embraces the Counties of Delaware, Randolph, Jay and Wayne).

Jefferson County.

Manual of the Botany of Jefferson County. By A. H. Young. (B.)
In 2nd Ann. Rep. Geol. Survey. Indianapolis, 1871.

Partial List of the Flora of Jefferson County. By John M. Coulter. (B.)
In 6th Ann. Rep. Geol. Survey. Indianapolis, 1875.

Catalogue of phænogamous and vascular cryptogamous Plants found growing wild in Jefferson County. By Charles R. Barnes. (A.)
To which is added:

Clark County.

A List of Plants growing in Clark County, but not found in Jefferson. By John T. Baird. (A.)
8vo, pamphlet, pp. 9. Madison, 1878.

Gibson and Posey Counties.

Flora of the Lower Wabash Valley, below the mouth of the White River. By J. Schneck, M.D. (B.)†
In 7th Ann. Rep. Geol. Survey. Indianapolis, 1876.
(Additions by the author in Botanical Gazette, Vol. ii., 1877.)

Wayne County.

List of Ferns, Mosses, Hepaticæ and Lichens collected in Wayne County. By Mrs. Mary P. Haines. (A.)

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*Continued from page 105.
†Also gives localities in one or two Illinois counties.

In 8th, 9th and 10th Ann. Reps. Geol. Survey, p. 235. Indianapolis, 1879.

ILLINOIS.

Contributions towards the Botany of the States of Illinois and Missouri. By L. C. Beck, M. D. (D.)
In Amer. Journ. Sci. and Arts, i series, Vols. x., xi. and xv., 1826 and 1828.

Catalogue of a Collection of Plants made in Illinois and Missouri by C. A. Geyer. By George Engelmann, M. D. (C.)
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In Proc. U. S. Nat. Museum, June 12, 1882.

Cook County.

Flora of Chicago and vicinity. By H. H. Babcock. (B.)
In the Lens, Vols. i. and ii., Chicago, 1872–1873.

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A List of Plants collected in the vicinity of Oquawka, Henderson County, Ills. By Harry N. Patterson. (A.)
8vo, pamphlet, pp. 18. Oquawka, 1874.

Peoria County.

Flora Peoriana: A Catalogue of Plants observed and collected in the vicinity of Peoria, Ill., 1852–1877. By Fred. Brendel. (A.)
In the Pharmacist, Vol. xv., Nos. 7 and 8, Chicago, 1882.

MICHIGAN.

Catalogue of the phænogamous and filicoid Plants collected on the Geological Survey of Michigan. By John Wright, M. D. (A.)
In Legislat. Rep. No. 23. Detroit, 1859.

Catalogue of the Plants collected by Wm. A. Burt in the primitive Region south of Lake Superior, in 1846. By Dennis Cooley. (B.)
In Jackson's "Lake Superior." Washington, 1849.

Catalogue of phænogamous and acrogenous Plants found growing wild in the lower Peninsula of Michigan, and the Islands at the head of Lake Huron. By N. H. Winchell. (B.)
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WISCONSIN.

Trees of Wisconsin. By P. H. Hoy.
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Localities of Plants collected in the North-western Expeditions of 1831 and 1832. By Douglass Houghton, M. D. (B.)
In Schoolcraft's "Narrative of an Expedition through the Upper Mississippi to Itasca Lake, the actual source of that River, in 1832.
Appendix. (Some of the localities given are in Minnesota.)

Plants of Wisconsin. By. I. A. Lapham. (A.)
In Trans. Wis. State Agric. Soc. 1852.
(Additions by I. A. Lapham in Trans. Wis. State Agric. Soc. 1860.)

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Systematic Catalogue of the Plants of Wisconsin and Minnesota.* By C. C. Parry, M. D. (C.)
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In Proc. Bost. Soc. Nat. Hist., Vol. vi.

Milwaukee County.

Catalogue of the Plants found in the vicinity of Milwaukee. By I. A. Lapham. (A.)
24 mo, pamphlet, pp. 12, Milwaukee, 1836; and 24 mo, pamphlet, pp. 24, Milwaukee, 1838.

W. R. G.
N. L. B.

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* See BULLETIN x., 103.

A New Species of Frullania.—*Frullania Pennsylvanica*, n. sp.*—Dioica. Caulis e basi amphigastriorum repens, dichotomo-ramosus; folia imbricata, plana, ovata, mucronata, rarius obtusa, integerrima, cellulis valde chlorophyllosis, marginem versus minoribus basi valde dilatatis, plus minusve regulariter hexagonis, parietibus validis; incrassatio angulosa subnulla. Auricula denudata, e margine folii oriunda, oblique a caule distantia, majuscula, cucullato-rotunda, sub orificio leniter contracta, ultra folii marginem demissa; amph. subimbricata, plana, late ovata, caulem excedentia, profunde partita, sinu angusto obtuso, laciniis ovatis, longe acuminatis, conniventibus; amenta mascula elongata, laxe foliosa, in ramulis parvis lateralibus, bracteis complicatis, lobis subæqualibus ovatis obtusis; perichætia in ramulis longioribus apicalia, sæpe ad basin dichotomiæ, fol. inv. complicata, integerrima, lobulis (ventrale minori) ovatis, acuminatis, basi valde angustatis; amph. invol. magna, carinato-concava, profunde partita, laciniis ovatis, longe apiculatis, integerrimis vel uno alterove dente munitis. Perianthia desunt.

Hab. in rupibus umbrosis, Stony Creek, Carbon County, Pennsylvania. Leg. E. A. Rau.

The plant is of about the size of *Frullania dilatata*, but the color is a dull olive-green. The tufts are depressed, and creep over rocks or over other Hepaticæ. According to the diagnosis of Mr. Austin's *F. Leana*, our plant must stand near it. I am not, however, in possession of the latter plant, though I do not doubt that they are two distinct species.

Leipzig, Germany. F. STEPHANI.

Gerardia tenuifolia, Vahl, **parasitic.**—To my knowledge, only those species of *Gerardia* that belong to the section Dasystoma (such as *G. flava* and *quercifolia*) have thus far been proved to be parasitic (cf. Gray, Struct. Bot., p. 38, and Flora of N. A., p. 291). I have recently found that *Gerardia tenuifolia*, Vahl, section Eugerardia, has its roots amply provided with haustoria, the structure of which I hope to be able to describe at some future time.

Hoboken, December, 1883. JOS. SCHRENK.

Note on Abutilon.—The involucre, so common in *Malvaceæ*, is, as every one knows, omitted in *Abutilon*, which, however, retains an interesting reminiscence of it in the joint seen in the peduncle some little distance below the flower. To-day one of my students showed me a specimen bearing one minute bract at this joint in the *Abutilon striatum* of the conservatories.

Providence, R. I. W. W. BAILEY.

Pinus rigida in Minnesota.—In my note on *Pinus Banksiana*, incidental reference was made to *Pinus rigida*. I saw but young trees without cones in these outskirts of the forests' westward march. Prof. Sargent, who is very familiar with the forestry of that region, kindly suggests that the trees were of *Pinus resinosa*—the former species not extending so far. THOMAS MEEHAN.

* Reproduced, at the request of the author, from *Hedwigia*, No. 10, 1883.

Melanthium latifolium, Desrouss, has been found in New Jersey. It was collected on a field excursion of the Club at Swartswood, Sussex Co., and first noticed by Mr. Wm. Bower, growing on a dry limestone ledge in open woods. A single flowering specimen was seen among numerous sterile plants, and this was fully four feet high, the panicle of greenish-brown flowers and half-ripened pods being two feet long and one foot in width. The leaves were all borne on the lower part of the stem and were eight inches long by two wide.

N. L. BRITTON.

Dioclea Boykinii.—I found this plant while collecting in S. Arkansas in 1881, but, unaware of its rarity, I put two or three specimens only in my hand-press, and sent those to Cambridge to Dr. Gray, from whom I learn that the species is so rare that a very few specimens only are known in the herbaria of the country. I propose to visit the locality next summer and collect enough for everybody, providing I get enough subscribers for the species to pay my expenses —my time being thrown in for the good of science.

Those who desire specimens should send their subscriptions to me as early as possible.

Fayetteville, Ark. F. L. HARVEY.

The Notholæna Lemmoni has been successfully grown during the past year in the conservatory of the Golden Gate Park, San Francisco, and in several other conservatories in the same city, and also in Oakland. It proves to be quite hardy and makes much larger fronds than in its habitat on the Santa Catalina Mountains. The fronds are 12–15 inches high and 2 inches broad, and the broad, dark border of fruit contrasts very finely with the silvery whiteness of the powder beneath. It is becoming a very popular fern.

Oakland, Cal. J. G. LEMMON.

Botanical Notes.

The Continuity of Protoplasm.—The subject of the continuity of protoplasm by means of delicate threads through the walls of vegetable cells attracted considerable attention at the meeting of the Biological Section of the British Association at Southport. Mr. W. Gardiner, who has examined fifty species of plants and found this continuity of protoplasm in all of them, pointed out that this fact places us in a position to obtain a clearer insight into such phenomena as the downward movement of a sensitive leaf upon stimulation, the influence of a germinating embryo upon the endosperm cells, and of the action of a tendril towards its support. Professor Hillhouse suggested that the protoplasmic threads may serve to transmit impulses from one cell to another and thus act somewhat like a nervous system. Dr. Carpenter remarked that there are forms in the animal kingdom in which the cell is never arrived at, but in which there is simply a continuity of protoplasm, so that the lower forms of the animal and vegetable kingdoms are here closely approximated to one another.

A Large Apple-tree.—In a note in the *Scientific American*, Rev. H. C. Hovey says:

While visiting an orchard near New Haven not long ago, the farmer, perceiving me to be taking notes as to the dimensions of his trees, told me that probably the largest apple-tree in the world was to be seen on the farm of Delos Hotchkiss, in Marion, Conn. I need not give the size as originally stated by my informant, which was, like most such matters, much exaggerated, for I have just had exact measurements taken, as follows:

Circumference of the trunk, near the ground.....15 ft. 3 in.
" " " three feet from ground.....13 ft. 9 in.
" " " at the forks.....16 ft. 2 in.
" " 2 main branches, from..10 ft. 4 in., and 8 ft. 8 in.
" of nine smaller branches, from.....4 to 6 ft. each.
Height of tree.....60 feet.
Diameter of tree top.....104 feet.

A peculiarity of this tree is that it is what is termed "an alternate bearer," five limbs bearing one year and four the next. The usual yield from the five limbs is about 85 bushels, although in a single instance it reached 110 bushels; and the four limbs vary from 35 to 40 bushels. The fruit is said to be excellent for winter use, though on this point I can only speak from hearsay.

The age of this venerable apple-tree is estimated at about 175 to 180 years. Curiously enough the patriotic old tree marked the centennial year by bearing fruit on *all* its branches, the first time it has been known to do so in its life, and it has continued to do so down to the present time. Some of the limbs are now dying, others are broken down, signs of decay appear in many places, and it is thought that this noble specimen of *Pyrus malus* will soon be numbered among the things of the past.

Botanical Literature.

Catalogue of phænogamous and vascular cryptogamous Plants of Worcester County, Mass. By Joseph Jackson. 8vo, pamph., pp. 48. Published by the Worcester Natural History Society.

Mr. Joseph Jackson has for some years given assiduous attention to the collection and study of the plants of Worcester County, Mass., and has now embodied the results in the form of this neatly-printed Flora. Among the cryptogams it includes only the ferns, equisetaceæ, and lycopods, The mosses, lichens and fungi would of course greatly extend it, and we hope the enterprising author will now give his attention to these.

The Worcester County Natural History Society, under whose auspices the publication is issued, appears to be doing excellent work in many directions.—W. W. B.

The Grasses of the United States: Being a synopsis of the Tribes and Genera, with a Description of the Genera, and a List of the Species. By Dr. Geo. Vasey. 8vo, pamph., pp. 47. Washington: Government Printing Office, 1883.

In the words of the author this "paper is an attempt to give a systematic synopsis of our grasses so far as known to the present time, with a description of the genera and a list of the species. Our

knowledge of some species is yet imperfect, and one object of this paper is to awaken such interest in the subject as may lead to further study and investigation of the same.

"The synopsis of the tribes and genera is chiefly a translation from the recently published Genera Plantarum of Messrs. Bentham & Hooker. The characters have been drawn up very briefly, but, it is hoped, with sufficient fulness to lead to the intended result. In drawing the characters of the genera the best authors have been consulted, a careful examination of specimens has been made, and the nomenclature conformed to the most recent views of floral structure."

Catalogue of the Flora of Oak Island, Revere, Mass.: with Notes. By Herbert A. Young. 8vo, pamph., pp. 19. From the *Bulletin* of the Essex Institute). Salem: Peabody Acad. of Science, 1883.

Oak Island, whose flora is here catalogued, is a slight, tree-covered elevation of land hardly reaching more than three or four feet above the surrounding salt-marsh, within the limits of the town of Revere, Mass., and just a few rods beyond the inlet that separates that town from the town of Saugus in Essex County. The entire number of plant embraced in Mr. Young's list, which includes phænogams, ferns and mosses, is three hundred and sixty-two.

Early Botanical Explorers of the Pacific Coast. By C. C. Parry. 8vo, pamph., pp. 8. Reprint from the *Overland Monthly* for October, 1883. (From the author.)

Deutsche botanische Monatsschrift, Organ für Floristen, Systematiker und alle Freunde der heimischen Flora. Herausgegeben von Dr. G. Leimbach.

This is a new monthly botanical journal published by the well-known botanist, Prof. Leimbach of Sondershausen. It accords the first place to systematic botany and the physiology of plants, and then to biology, morphology, teratology, etc. It is to give elaborate, and, if necessary, well illustrated articles from the pens of the most eminent members of the botanical fraternity in all parts of the world, and will contain elaborate reviews of new works, as well as of the important articles that appear in the chief botanical journals of the world. The subscription price, $1.50, is very low.—G. E.

Proceedings of the Torrey Club.—At a regular meeting of the Club Tuesday evening, Sept. 11, the chair was occupied by Prof. E. H. Day, and eighteen persons were present.

New Stations discovered on Field Days.—Prof. Hyatt reported North Yonkers as a station for *Cypripedium pubescens*, Swartz., and Tottenville, S. I., for *Asclepias variegata*, L., a plant new to the Island. Prof. Day stated that he had found *Senecio candidissima*, commonly known as dusty miller, spontaneous at Highlands, N. J.

During the excursion to Swartzwood, N. J., on Aug., 4th, *Melanthium latifolium*, Desrouss, a plant new to the local flora, was detected. The *Nelumbium* was found in flower. Prof. Day reported Waretown, N. J., as a new station for *Kosteletzkya Virginica*, Presl., and stated that *Althæa officinalis*, L., had been found in abundance by him at Sand's Point, L. I.,

Miss Knight remarked upon the mosses found in the dells of Wisconsin and announced the discovery by her of *Eustichium Norvegicum*, Br. Eu., in fruit,

Prof. Martin exhibited a pink variety of *Impatiens fulva*, Nutt., and an example of heterogamy in Indian corn.

At the regular meeting held Tuesday evening, Oct. 9th, the President occupied the chair and twenty persons were present.

Plants noted on Field Days.—Messrs. Wilber and Bicknell reported that they had found a white-rayed variety of *Aster Novæ-Angliæ*, L., at Van Cortlandt, N. Y. Mr. Hollick stated that he had found the var. *roseus* of the same species on Staten Island.

Dr. Britton gave Tottenville, S. I., as a station for *Trichostema lineare*, Nutt., a plant new to the Island.

Prof Hyatt remarked upon some of the more notable plants that had been observed by him during a trip between Cincinnati and Chattanooga.

Adventitious Leaves in Rhus.—Mr. Schrenk exhibited a specimen of *Rhus Toxicodendron*, L., in which the inflorescence was replaced by tufts of leaves. (The same change has heretofore been noted in the BULLETIN as occurring in three other species of the genus—*R. glabra typhina* and *copallina.*)

At the meeting of Tuesday evening, Nov. 13th, the chair, in the absence of the presiding officers, was occupied by Prof. Day. There were twenty-six persons present.

Teratological.—Mr. Brower exhibited a specimen of *Amorpha fruticosa*, L., with fasciated stem, and one of *Cocculus Carolinus*, D C., with polymorphous leaves.

Mr. Schrenk remarked upon the structure of tuckahoe and upon the parasitism of *Gerardia tenuifolia*, Vahl (see page 132.)

Late-flowering Plants.—The following plants were reported by various members as being in flower for the second time this season: *Lonicera semipervirens*, Ait. (Miss Knight); *Viola sagittata*, Ait., *V. pedata*, L., and *V. primulæfolia*, L. (Mr. Hollick); *V. cucullata*, Ait. (Mr. Bicknell); and *V. lanceolata*, L. (Mr. Bisky). Dr. Britton remarked upon and exhibited under the microscope, specimens of *Protococcus* (*vulgaris*?) taken from the bark of trees in Brooklyn.

On motion the chairman appointed a committee of three (Messrs, Britton and Hyatt and Miss Knight) to consider a plan for forming a subsection of the Club for the study of physiological botany.

One person was elected an active member.

Correction.—*Pyrus arbutifolia* in Mr. Ridgway's note on pages 121 and 122 should of course read *P. Americana.* The error is so apparent that every reader of the BULLETIN has doubtless noticed and corrected it.

Vol. X. DECEMBER, 1883. No. 12.

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OF THE

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